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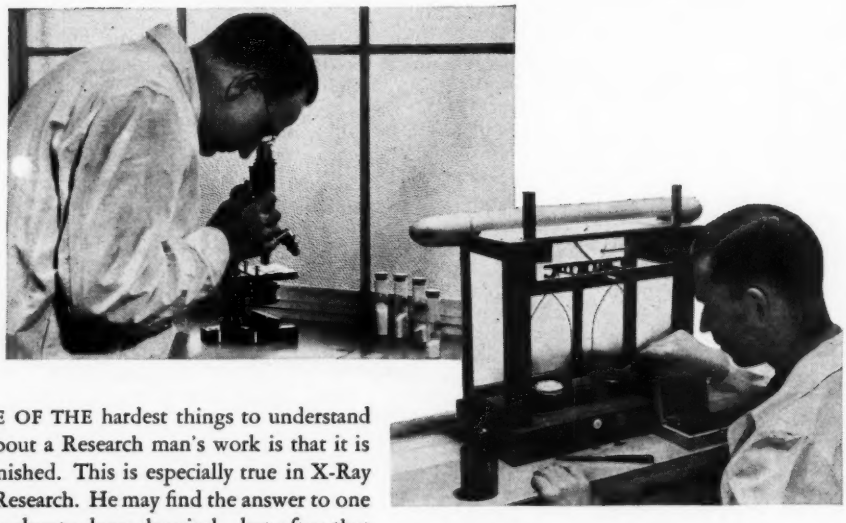

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1 Science, Mch. 14, 1941, p. 261.
2 Spies, Cooper, Clark & Blankenhorn, Jr. A. M. A., Feb. 26, 1938.
3 Jr. A.M.A., 104-16, 1377-1935.

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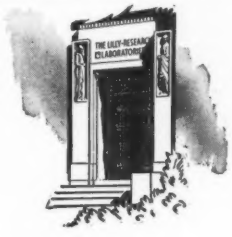

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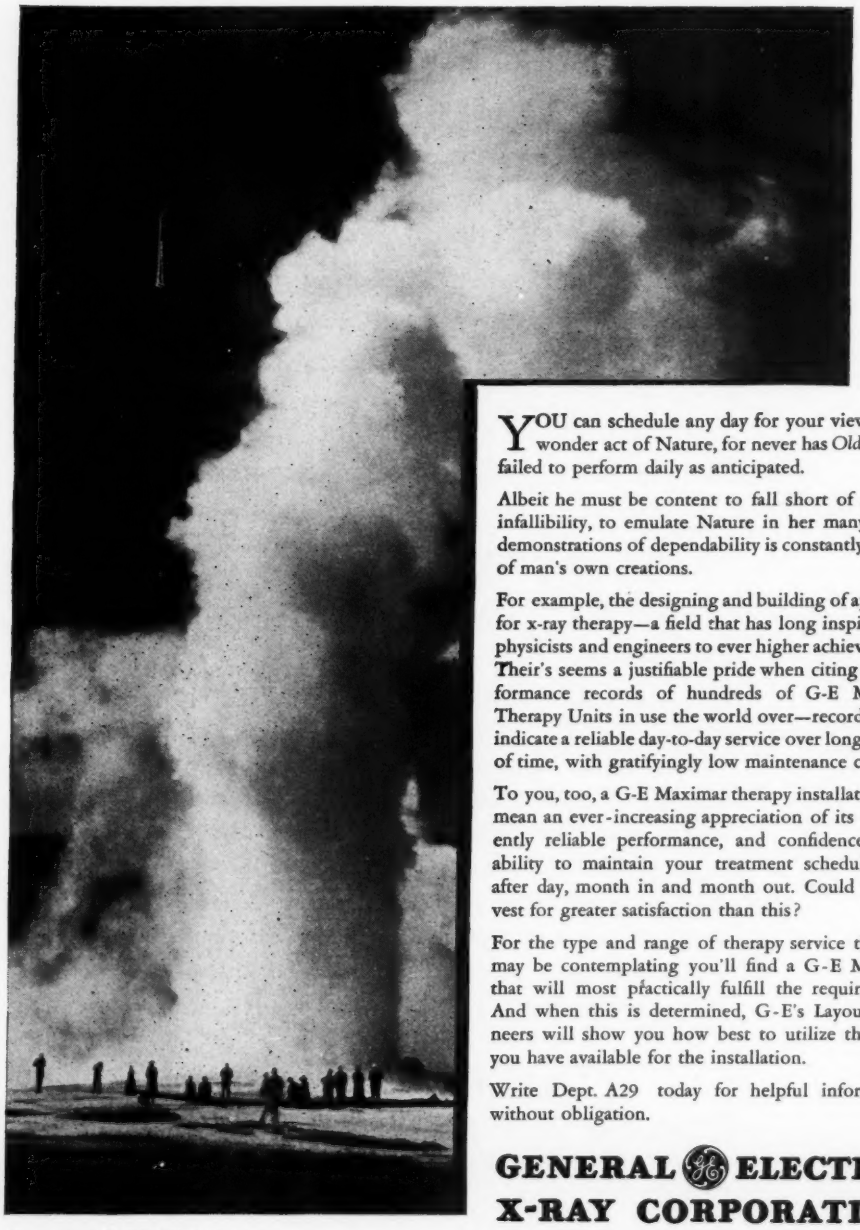

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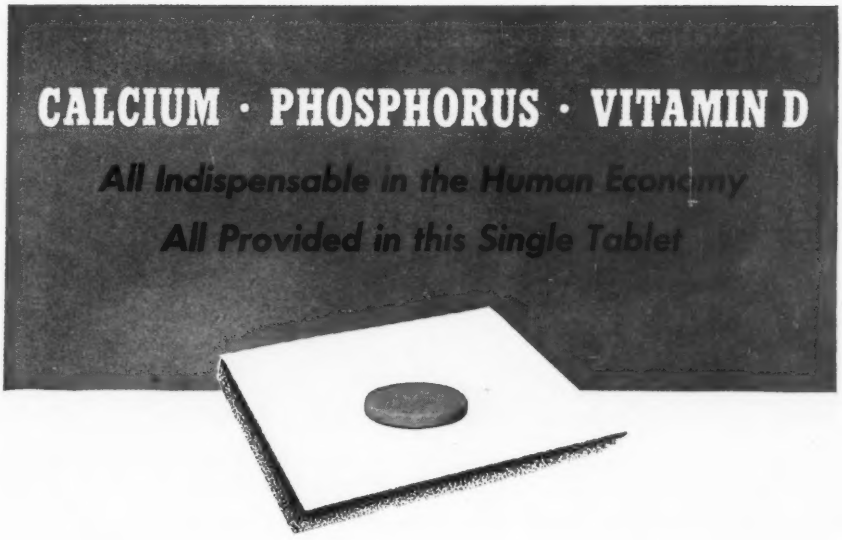

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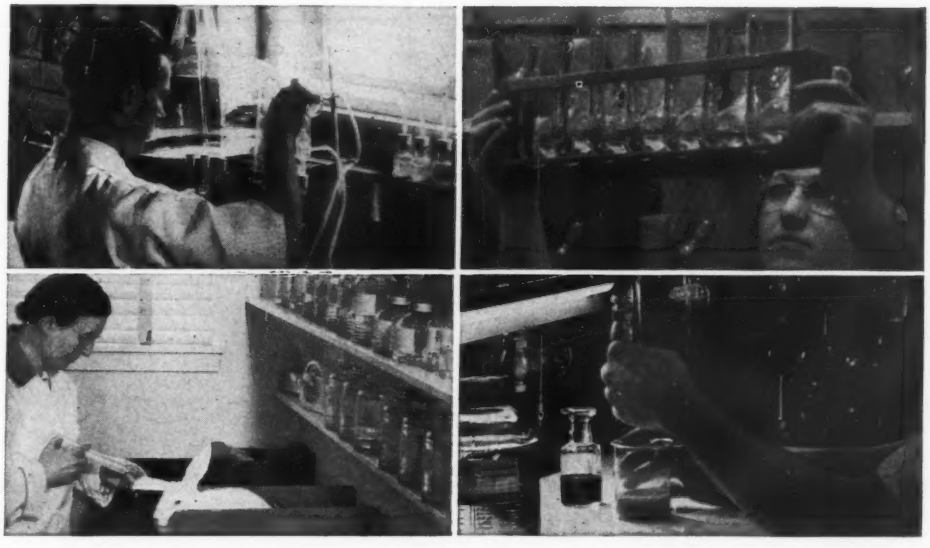

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Common problems in the management of peptic ulcer

"How has the mortality from gastric hemorrhage due to ulcer been reduced in one hospital from 29% to 3%?"

The administration of Amphojel* by the continuous intra-gastric drip method has resulted in a greatly reduced mortality in cases of gastric hemorrhage due to peptic ulcer.

Four striking features of Amphojel, Wyeth's Alumina Gel, are recognized by clinicians:

Amphojel provides prompt relief from pain. It permits rapid healing of the ulcer. It cannot be absorbed and eliminates the hazard of alkalosis. It reduces excess acidity without completely neutralizing the gastric contents.

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Amphojel, Wyeth's Alumina Gel

Fluid Antacid . . . Adsorbent

One or two teaspoonfuls either undiluted or with a little water, to be taken five or six times daily, between meals and on retiring.

Supplied in 12-ounce bottles

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For the Convenience of Ambulatory Patients

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One-half or one tablet in half a glass of water. Repeat five or six times daily, between meals and on retiring.

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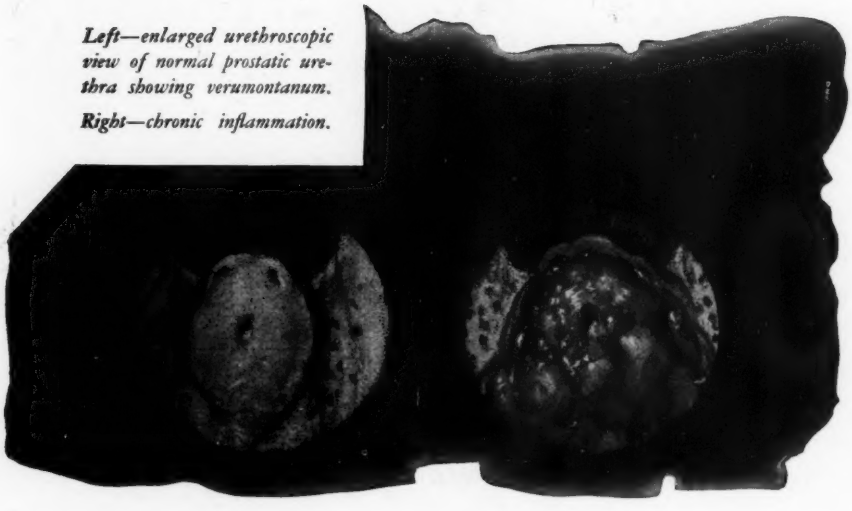

Left—enlarged urethroscopic view of normal prostatic urethra showing verumontanum.

Right—chronic inflammation.

Another important contribution has been added to the published reports on the effectiveness of Pyridium for prompt symptomatic relief in common urogenital infections. **Morrissey** and Spinelli* state:

"**In the cases** of prostatic hypertrophy it was observed **that urinary** frequency by day and night was markedly **diminished** in those cases showing a residual not above **5 ounces. The** associated cystitis commonly observed in **these cases** of hypertrophy was noted to be improved from **the standpoint** of pain and discomfort. Following cystoscopic diagnostic procedures in all of these patients—**pyelography**, urethral and ureteral dilatation—the usual **need for** opium or other analgesics was absent, these cases **all having** been given pyridium prior to cystoscopy."

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TRADE MARK
(Phenylazo-Alpha-Alpha-Diamino-Pyridine Mono-Hydrochloride)
A decade of service in urogenital infections

*An experimental study of the anesthetic and analgesic properties of pyridium, J. Urol. 44: 381-385, Sept. 1940.

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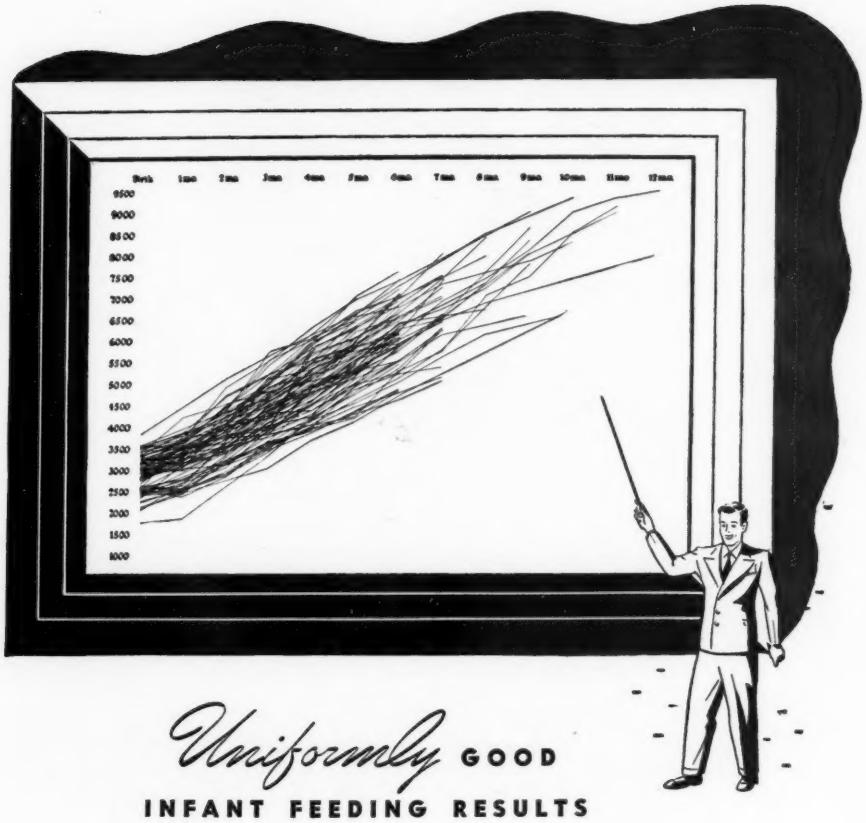

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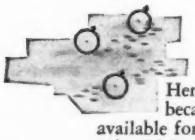

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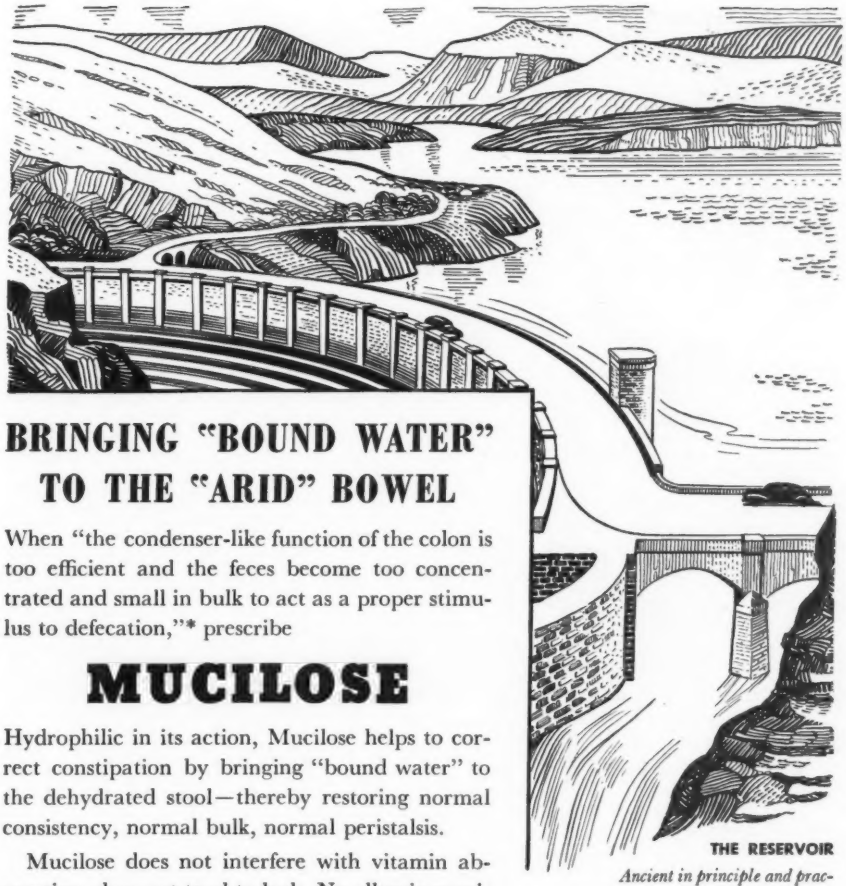

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*Welch, P.B. and Kauders, F.H.; The Physiologic Approach to the Correction of Constipation.

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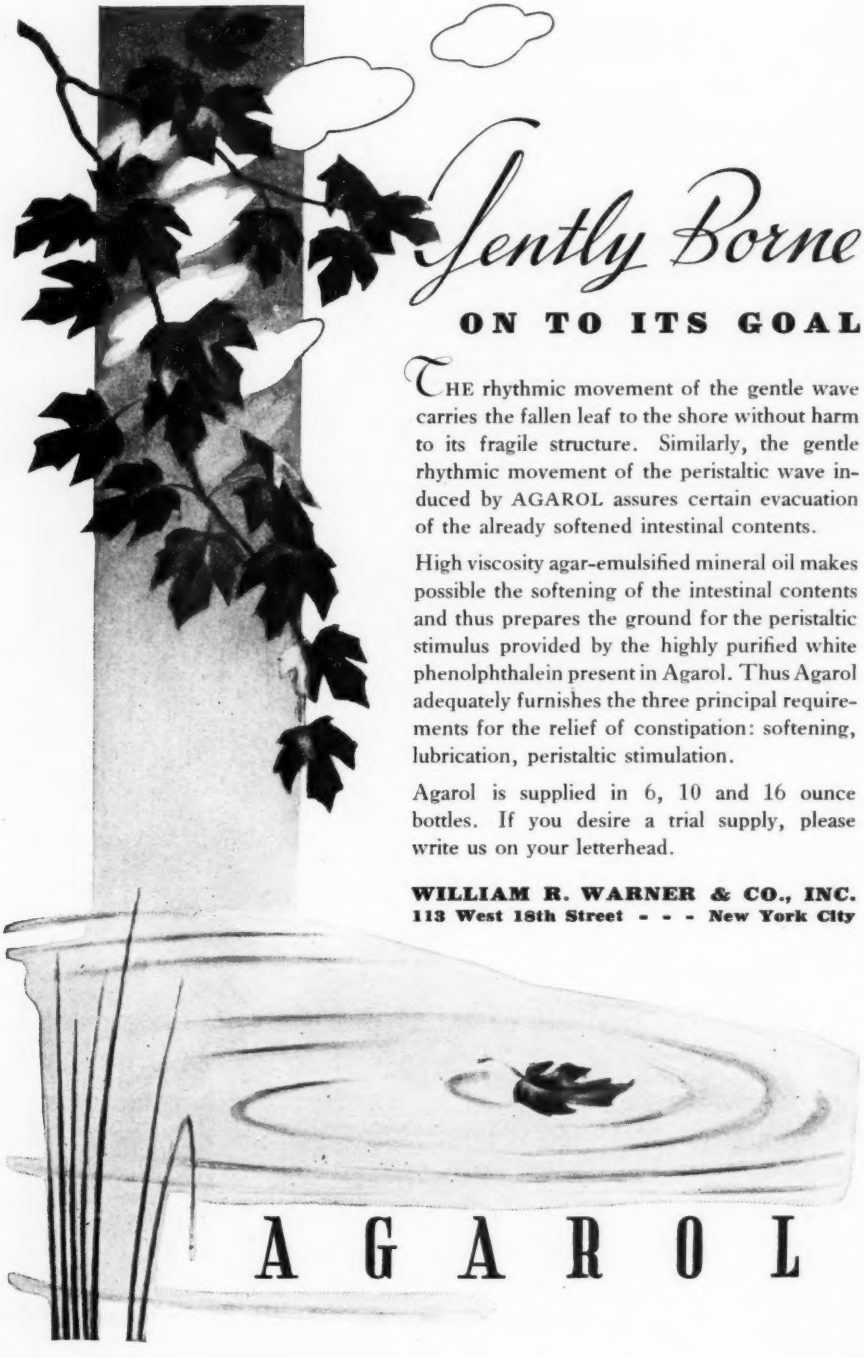

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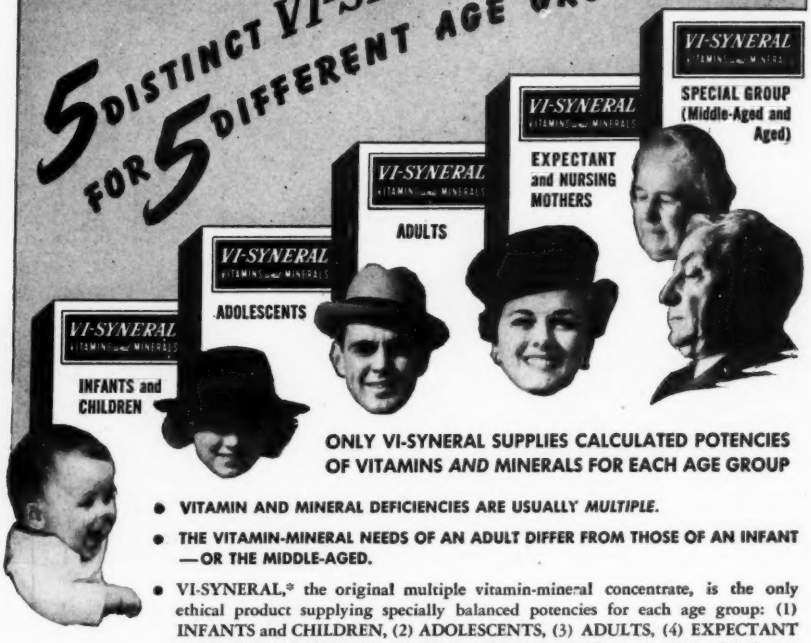

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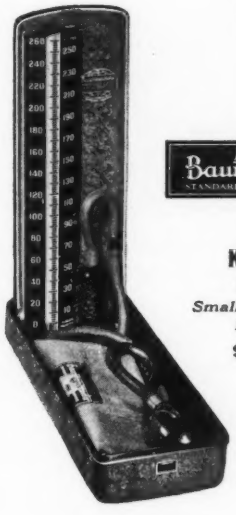

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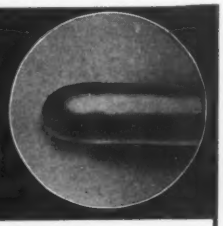

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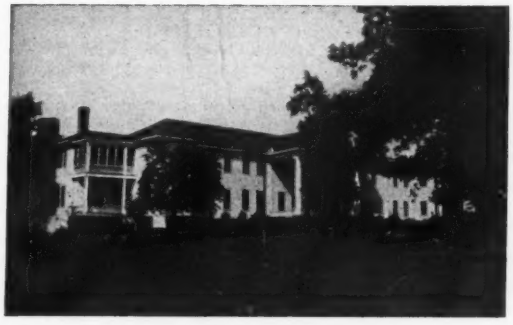

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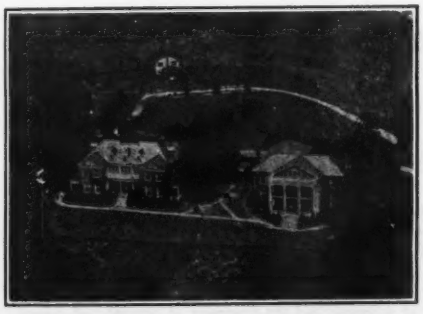

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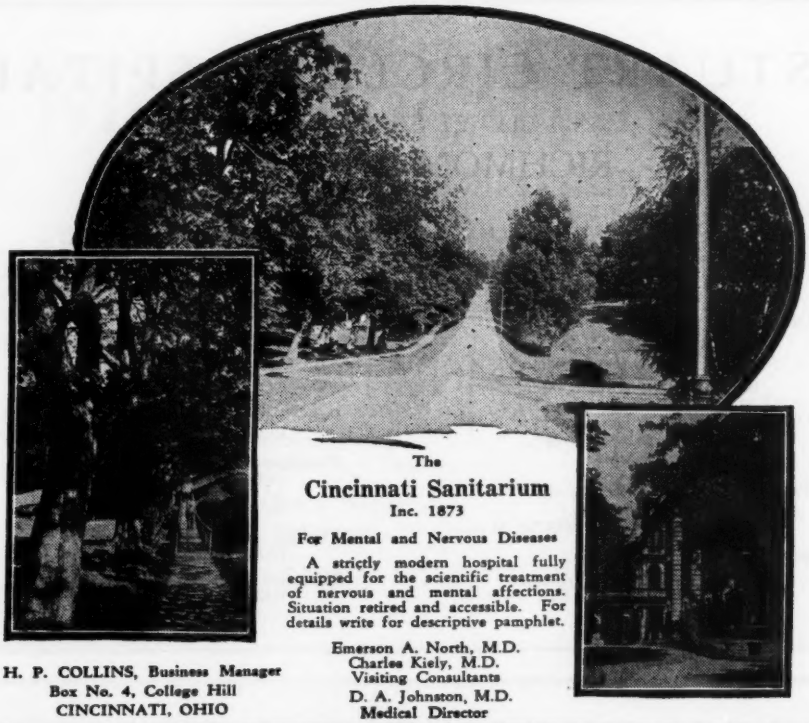

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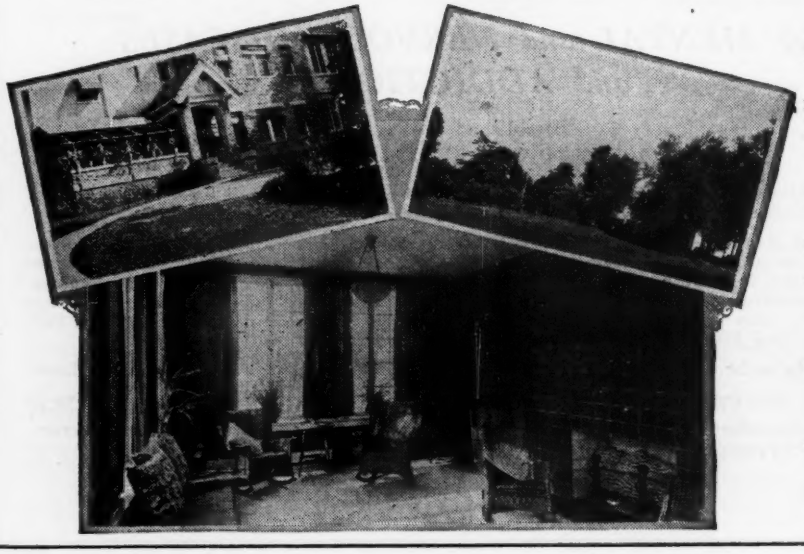

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ACCIDENTS IN RENAL SURGERY*

By NELSE F. OCKERBLAD, M.D.

and

HJALMAR E. CARLSON, M.D.

Kansas City, Missouri

It was an accident in the course of a kidney operation which caused one of us in 1932 to invent an apparatus to hold the patient securely on the table during operation. We had on that occasion a 250-pound negress on the table, blocked up with sandbags and fastened down (Gulliver-like) with adhesive plaster and had "broken" the table to get space. We had just put the clamps on the pedicle when she struggled free and almost fell off the table. It was a moment never to be forgotten. It changed our approach to kidney surgery and we made forthwith several permanent improvements: (1) we invented the apparatus to hold the patient securely on the table; (2) we began routinely to employ procaine hydrochloride as spinal anesthesia. With these two advances renal surgery has become a pleasure and we have reduced accidents to a minimum.

During the past 25 years in our practice accidents of several different types have occurred in the course of our operative procedures. We have also observed "accidents" that have happened because incompetent surgeons were attempting operations beyond their ability.

In this category we recite three cases.

(1) A case came to our notice some years ago in which a urologist was called in consultation to make a diagnosis. The patient had pain in the right side and pus in the urine. The surgeon asked only that the left kidney be investigated to see whether it was a functioning organ. He was planning to remove the right kidney. The urologist passed a ureteral catheter to the left kidney and obtained clear urine and a satisfactory dye output. No x-rays or pyelograms were made. The urologist told the surgeon that the left kidney was apparently functioning normally. The surgeon proceeded to remove the "right" kidney. Following the operation the patient had a total anuria and died in 14 days. Autopsy revealed no kidney tissue remaining in the body. Examination of the operative specimen showed it to be a unilateral fused kidney with ureters placed normally in the trigone. Of course, the surgeon did not intend to remove all the kidney tissue. This was a surgical accident.

(2) More recently and with less excuse a general surgeon attempted a difficult nephrectomy. Bleeding was encountered that could not be easily controlled. Clamps were applied to the bleeders and left on, the wound being closed about them and the patient sent back to his room. At the autopsy soon after it was found that one of the clamps had been placed across the vena cava.

(3) A number of years ago, one of us was asked to assist a general surgeon of the old school in a kidney operation. We were young and enthusiastic and glad to get our hands in on any operation. We were amazed at the blind rough technic employed to free the kidney. Seizing something at the bottom of the "hole," this gentleman delivered it to the surface. What he held in his hand looked like a lily and we felt that we could well have a real one in our own hand. At that point I (N.F.O.) took charge of the operation and properly freed the kidney and sutured the pelvis back into the kidney and it healed. Needless to say, the stone for which we operated fell out of the evulsed kidney pelvis.

So much for the other persons' accidents. The rest of them are our own.

INJURIES TO THE VENA CAVA

(4) The literature is full of references to this accident. It has happened to us. We were called in consultation by the orthopedic surgeon to see a girl with a marked spinal curvature who had a very loose right kidney. It was also a very painful kidney. When we opened down into this renal area we could find no suitable place to fix the kidney because the curvature had so disturbed the anatomy. The only procedure which seemed of value was a nephrectomy and this was carried out. In doing this operation the cava was torn. We repaired it and the patient is alive and well 9 years afterward.

INJURIES TO THE RENAL VEIN

(5) It might seem at first thought that injuries to the renal vein were of no great importance. Constric-

*Read in Section on Urology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

tions resulting from such traumatisms might have serious consequences. Where the pedicle is long and mobile it is easily possible to sew a rent in the renal vein with fine silk. In cases where the pedicle is short repair may be more difficult. On two occasions we have made use of live muscle grafts to repair such rents in the vein. The vein is held in the fingers, the area cleaned off, the muscle is roughened by scraping it with a knife and then it is applied like a patch and pressure made for several minutes with the fingers. The muscle patch will adhere and thus constriction of the vein is avoided.

INJURY TO ADJACENT VISCERA

(6a) *The Duodenum.*—Some years ago one of us made this subject the subject of a paper and collected and reviewed all the cases of duodenal fistula which had resulted from kidney surgery or had occurred in the course of a nephrectomy. One experience with this accident is enough for the life-time of the surgeon.

The duodenum, as you will recall, lies upon the renal pedicle and the anterior surface of the right kidney. In operations upon the right kidney, the duodenum is generally not seen, being dissected off with the fatty capsule of the kidney. In cases where there is considerable amount of thickening of the kidney pedicle and there is a large amount of inflammatory reaction the duodenum is generally adherent and must be handled with care. There must under no circumstances be wild, blind clamping of bleeders, sight unseen. Careful dissection with everything under vision will avoid this accident. A renal surgeon who tries to hurry may get into serious difficulty.

(6b) *Injuries to the Colon.*—On the right side in addition to the duodenum there is also the cecum and the ascending colon as well as the hepatic flexure. It is possible to injure any or all of these structures during the course of a kidney operation. We have had one case of injury to the colon on the right side and two on the left side. These injuries came about because the intestine was adherent to the peritoneum at that point. Sometimes the injury happens no matter how much care is used. Injuries to the large bowel are not, of course, as serious as injuries to the small bowel.

(7) *Injuries to the Peritoneum.*—This accident is generally of a very minor nature and happens regularly in the course of renal surgery. Perhaps in one out of five kidney operations the peritoneum is accidentally opened. If the injury is recognized and promptly closed peritonitis never results. If, however, even a tiny hole is left in the peritoneum a fatal peritonitis will probably result. We have had such a case. A patient with a large pyonephrosis of the right kidney was nephrectomized. When the peritoneum, which was densely adherent to an abscessed kidney, was dissected free a tiny rounded hole was left. We looked about rather carefully for this defect, but could not find it. The wound was closed with drainage, but the patient died on the fifth day of a peritonitis. This tiny hole was found at autopsy. Such an accident could not occur today with our routine use of sulfonamide compounds in infected cases.

(8) *Injuries to the Diaphragm.*—On four occasions in our experience rents in the diaphragm have been made, three on the left and one on the right. In each instance the defect was recognized and sutured. Our patients made uneventful recoveries. Generally the anesthetist tells the surgeon promptly that something out of the ordinary has happened, for this accident profoundly upsets the respiratory process. Prompt closure as well as correct closure is necessary. If the accident is not recognized and therefore the diaphragm is left open, death results. We have seen one such case.

(9) *Injuries to the Ureter.*—Of all the embarrassing accidents this is the worst. It is usually unexpected and sometimes the ureter breaks as suddenly and unexpectedly as a shoelace. Sometimes the ureter can be secured together by end-to-end anastomosis, but on occasions this cannot be accomplished for various reasons. On three occasions this has happened to us. In the first case, we were searching for two small stones, one of which was in the ureter and the other in the kidney. The stone which was in the ureter was very tightly impacted and although we were very careful in trying to free it, the ureter was very badly torn. Two strips were torn out of the ureter front and back, leaving two very narrow strips on the sides. The ureter was very carefully stitched together. The second stone could not be found. Imagine our surprise when on the fifth postoperative day we saw a small black stone on the dressings. It had been extruded through the drainage tube and, worst of all, through our nice repair of the ureter. The stone corresponded in every detail to the x-ray shadow of the stone which was in the kidney. This wound drained for a period of 28 days and then closed. Subsequent pyelograms showed a normal kidney and ureteral outline and no stone shadow was seen.

The other two cases did not have such a

happy ending and ended in nephrectomy because our repair of the ureter did not heal.

(10) *Losing Control of the Pedicle.*—This accident has happened to us but three times and each time we have successfully recovered control. It may become very dangerous thus to have the pedicle get away. The most important single causative factor in such an accident is that the surgeon does not take time to develop the pedicle and remove the tissues surrounding the renal vessels. If this is carefully done and the vessels are divided and clamped individually, there is no danger of slipping out of the clamps. Sometimes, of course, on difficult operations the pedicle may be thickened and the wound deep, and the pedicle may slip out of the heel of the clamp just as the ligature is being set. We formerly tied the pedicle with double number 2 chromic, but now we tie with single number 2 and find it much safer.

(11) *Hemorrhage.*—Hemorrhage that occurs at the time of operation can usually be controlled, although there are certain kidney tumor cases in which the vena cava is invaded and markedly dilated. We have encountered one such case where opening into this enormous blood space caused a fatal hemorrhage while the patient was still in the operating room. We have never yet had a fatal postoperative hemorrhage. Only once have we ever left the clamp on a renal vessel. We have had several cases where large hematomas have formed in the deep muscle layers, but these were not in anyway dangerous. Such hematomas always delay healing and if they become infected it is tedious work to heal them.

(12) *The Wound Breaks Open.*—This accident is not peculiar to kidney surgery and happens in abdominal surgery far more frequently than to the kidney surgeon. We have had three such cases. Two of these were in cases where nephrectomy had been done for tuberculosis. One of these caused us a great deal of trouble. We cleaned the wound and closed it no less than three times. We used both silk and silver wire, but it broke open each time and finally remained open until the patient died two years later. It is our considered opinion that the type of suture material used has nothing whatever to do with the breaking open of the wound, but that the state of the patient's physical economy is the determining factor. Infection plays a major role. However, any condition which lowers the patient's bodily resistance and changes his metabolic processes may cause the failure of a wound to heal.

(13) *Injuries to Nerves.*—This is probably a very common accident. The mass closure used by some surgeons who sometimes employ steel or silver wire sutures may result in nerve injury. This is brought about by including the nerve in the suture which necessarily has to be taken wide and deep. Careful closure of a kidney wound layer by layer, being mindful not to include nerves in the suture, is important. Injury to nerves may cause sagging of one side of the abdomen, hernias and areas of cutaneous anesthesia. With care this accidental injury to nerves can be avoided.

CONCLUSION

We have recounted the accidents in renal surgery in the spirit of humility and confession. There seems to be a certain group of unavoidable surgical accidents connected with kidney surgery. It would seem with experience and care we can reduce these accidents to a minimum. There are several ways in which we can do this: (1) by making a careful diagnosis and knowing in advance what will be found, (2) by operating with care and deliberation with the patient in a good position in a good light with adequate exposure, and (3) by careful closure of wounds and Listerian technic where infection is present. Most of the accidents enumerated here have not happened to us a second time.

DISCUSSION (*Abstract*)

Dr. Harold P. McDonald, Atlanta, Ga.—Kidney surgery, like golf, is humbling at times. All of us who do much kidney surgery have accidents and make mistakes from time to time that deflate us.

The main idea in recounting these accidents is to learn from our mistakes and to try to keep them from recurring. We have had our share of these accidents. For example, Dr. Elder, a good many years ago, was doing a nephrectomy on a patient with a large tumor of the kidney. During its exposure and freeing, the tumor, which was quite large, popped out of the incision and bounced across the floor. Dr. Elder caught his breath and had a sinking feeling in his stomach. He expected to see a stream of blood spurt out of the wound, but it did not. Fortunately, there were no large vessels going into this tumor. The operation then proceeded without incident.

Injuries to the diaphragm are rare in our experience. This is probably due to the fact that tuberculous disease of the urinary tract is relatively rare in Georgia and we do not see a great number of the plastered down fibrous adhesions found in renal tuberculosis. Hence we have not encountered any injuries to the dia-

phragm nor have we made any pleural openings during kidney operations.

We do get into the peritoneum once in a while, but fortunately have been able to recognize it and close up the opening. No complications have arisen from these accidents.

Aberrant vessels at the upper pole are sometimes seen and unless recognized during the dissection they may be torn off and may bleed. In order to prevent such occurrences we feel that good exposure and careful dissection are essential. Especially is this true near the pedicle. The practice of blind digging around in the wound with the finger and rough handling cannot be too strongly condemned. A self-retaining Balfour retractor has been helpful to us in securing and maintaining good exposure.

Loss of the kidney pedicle is an accident that every kidney surgeon dreads. We have not had this accident. Recently, however, I saw a surgeon lose the entire kidney pedicle after removal of a kidney. After much sponging and clamping he finally packed the wound with four large abdominal packs. This controlled the bleeding and four through-and-through sutures closed the wound. By three transfusions and all night work on the part of a good resident the man survived, but it seemed incredible to me that a man could lose so much blood and live.

Other accidents that occur in renal surgery are those that concern the ureter. A stone in the ureter can cause enough infiltration and softening of the ureter so that it is friable and easy to puncture with a ureteral catheter. A study several years ago by Miley Wesson showed the normal ureter could be punctured with the ordinary ureteral catheter with extreme difficulty. Recently we had a patient with a stone in the upper ureter. Upon cystoscopy and attempted catheterization of the ureter the catheter passed through the ureteral wall at the site of the stone. The patient was operated upon immediately and the stone removed and nephrostomy done. Recovery was uneventful.

Upon attempting to remove a stone in the lower ureter from another patient we lost the metal tip and filiform end of a Johnson stone basket. This was removed at operation.

We are indebted to Dr. Ockerblad for this frank discussion of accidents and mistakes that occur in renal surgery. We can all profit thereby. We can use careful preparation of both surgeon and patient. We can make careful diagnoses and do careful work, especially in freeing the kidney and around the pedicle. Let us profit by looking ahead far enough to avoid some of these pitfalls.

Dr. H. McClure Young, Columbia, Mo.—I have a case that I think ought to be reported before this Section, and Dr. Ockerblad has given me courage to report it. This was a young man who was referred to me by the social service worker in the county. He was found to have a small stone about as large as a pea in the pelvis of the right kidney. It was giving him a great deal of trouble because it was in the pelvis, and lodged just at the exit where the ureter comes off and would block it and cause him to have pain and fever.

The case was quite carefully worked up, and a bilateral catheterization of the ureters was done. It was shown that the pelvis of the kidney was very small and was situated well inside of the kidney, so it was determined to do a nephrotomy and not attempt a pyelotomy. I delivered the kidney and split it. Everything went along very smoothly, but the pelvis was so small that I think I failed to get quite into it. When I put my finger in, I could feel a little stone right under my finger. I put my finger around it and it came out very easily. When I got it out, to my horror I discovered it was completely encased in adherent mucous membrane that had the shape of a small kidney pelvis. What I had done was to take the mucous membrane lining the kidney pelvis out along with the stone.

I had never heard of such an accident. I think it must be very uncommon. I decided simply to drain the kidney and await events. The sequel, to me, is very instructive. The man made an uneventful recovery, and he was put on mandelic acid to prevent recurrence, and at the end of two or three months I got him back in and made a pyelogram of that side. I got an outline of a perfectly good kidney pelvis. I dismissed him and he had no further trouble. This was about four years ago. Recently the social service worker who brought me the case originally told me that he was perfectly well.

So I think the case demonstrates the great power that the kidney pelvis has to reform the mucous membrane which lines it. That experience may help somebody in a pinch, although it was rather humiliating to the surgeon at the time.

Dr. Ray M. Bobbitt, Huntington, W. Va.—I think this case should be reported. It is one of those lucky accidents, and it may happen to any of you.

This patient was seen by us two months ago with a cortical abscess of the kidney, which was finally diagnosed and operated upon. The cortical abscess was in the upper part of the kidney and quite small, and the kidney was not removed. It was drained and she made an uneventful recovery. Drainage lasted some two weeks and she went home, apparently well. We saw her at the office two months after that and she was apparently well. About two days later she began to have pain in the same side, the right side, and was brought back in the hospital about three days later with 33,000 white cells, with 96 per cent polynuclears and a big mass in her right side. She had only an occasional pus cell in the urine. We immediately supposed she had a recurrence of her cortical abscess, which at this time was perinephritic. X-ray showed obliteration of the psoas muscle and there was curvature of the spine to the opposite side. We assumed that she had a perinephritic abscess.

She was operated upon, and when we went in we found a large inflammatory mass, everything adherent. When I tried to deliver this huge mass, I met with some very marked bleeding, and finally the bleeding became so marked I had to do a quick nephrectomy, but I found no free pus. I was not quite satisfied with the situation. I had accidentally opened the peritoneum anteriorly and on palpation found a mass which turned out to be an empyema of the gallbladder, which was probably six inches in diameter. Through the kidney incision we put a trochar in the gallbladder and drained out a large quantity of pus, and then put a two-way urethral catheter in and drained the gallbladder through the kidney incision. The patient

was operated upon about ten days ago, and has been making a very nice recovery.

Dr. Austin I. Dodson, Richmond, Va.—When I saw the program of this meeting I felt that I could discuss Dr. Ockerblad's paper because there are few accidents in renal surgery that have not occurred in my own practice. I would like to mention my own experience with two cases of injury to the vena cava and to give the reason why I think fatalities occur in accidents to the renal vessels or the vena cava. If the surgeon does not lose his head at the time of the hemorrhage he rarely loses the patient. In the cases in which I have seen serious results follow severe hemorrhage at the time of nephrectomy, it has seemed to me that the surgeon and his assistant spent so much time putting in and pulling out gauze and swabbing out clots that the patient lost too much blood before it was brought under control. I have seen the same thing happen to other surgeons who promptly made pressure on the bleeding area with a finger or small gauze sponge and held it until it could be identified and controlled. If we train ourselves as to what we would do in the case of an accident serious consequences will rarely occur. On two occasions I have injured the vena cava. Both patients were very stout and one had a very large tumor mass. In both cases a Kelly clamp was placed on the injury, the convex surface toward the vena cava and left about four days. In both instances the patient made an uneventful recovery.

I had another rather odd accident. A retractor was placed in such a way that it blocked off blood from the external iliac artery. A calcified plaque in the artery was thought to be a stone in the ureter and the artery was opened and the plaque removed. The artery was tied on both sides of the incision and was not divided. The ureter was then located and the stone removed. The patient had no trouble whatever. This man's vessels were all sclerotic and evidently some collateral circulation had occurred.

I would like to emphasize that if we do enough surgery we will have unfortunate accidents. The manner in which the surgeon conducts himself following the accident has the greatest influence on the outcome of the case.

Dr. Berlin B. Nicholson, Parkersburg, W. Va.—I should like to mention here an unusual injury.

It occurred in an old gentleman around the age of 70, who had had a rather long-standing renal infection. He had a large calculous pyonephrosis and his vessels were rather sclerotic. I did a nephrectomy through the usual flank incision, and in doing it everything went along all right. I removed the ureter well down over the brim of the pelvis, hoping to get rid of as much of it as possible through the one incision. The ureter was greatly thickened and was the diameter of one's finger. While it was rather adherent over the brim of the pelvis, I do not think I was unduly rough in my dissection. At any rate, the day following operation the patient began to develop signs of failing circulation in the right limb, the side on which I did the nephrectomy. We applied intermittent pressure and suction on the leg with the hope that in some way collateral circulation might be established. This did no good, and after about four or five days I asked the orthopedic consultant to do an amputation.

Prior to operation, when the patient was in the operating room, a number of the men being rather interested in the situation, I asked one of the general surgeons to look at the leg. He examined the limb prior to preparation for amputation, which I think was carried out just above the knee. Things went all right so far as the operation was concerned, but forty-eight hours after the amputation the patient began to become rather toxic. We inspected the wound. It looked clean but, to our surprise, there was marked crepitation due to gas in the stump. So the question arose as to why the gas bacillus infection should be present. On reflection I recalled that the general surgeon who had examined the leg had just removed an appendix, which he had cut open for examination. He had examined the leg without having first disinfected his hands. Whether that could have been the source of the gas gangrene, I do not know.

FISTULECTOMY*

By JNO. L. JELKS, M.D.
Memphis, Tennessee

This is largely a technical description of my methods of dealing with perirectal abscesses and fistulae and my reason for appearing on this program is the fact that I have personally visited a number of you who are doing the best rectal work in the country and each of my three assistants also have visited your clinics and they confirm my observations that in some respects my technic varies.

The technic that I will describe as best I can insures more certain complete repairs and less scarring deformities and with the permission of your chairman I will with my crude art be better able to demonstrate certain features.

A little academic discussion seems necessary to classify roughly anatomical and pathologic and infective differences. Almost all abscesses and fistulae are secondary to an infection higher up, some of which infective organisms land in a crypt of Morgagni. This infection may remain a superficial affair or the infection may spread either rapidly or as a result of neglected early intervention be carried by the lymphatics or by pressure or both into the several perirectal spaces (ischiorectal fossae and the superior pelvirectal spaces). Some of these infections will spread quite rapidly, so rapidly in fact, that within only a few days all of the previously named spaces have become invaded. It has been my experience that by far the greater amount of destruction of pelvic tissue has been

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*Read in Section on Proctology, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

in cases which have resulted from the injection treatment of hemorrhoids in many of which all of the perirectal spaces have been involved. The necrosis has been so extensive that I have marveled at the result of radical surgery which gave little deformity with complete control of the bowel and an exceedingly small amount of scarring.

Some of my confreres have presented papers before this society upon the same or a similar subject and have shown in lantern slides pictorial results of their operations with very severe scarring.

In 1900, in Asheville, N. C. (Mississippi Valley Medical Association), I first described my radical departure from the practice then in vogue of simply "opening the abscess and breaking up the loculi." I described my incision as so wide as to make the abscess represent the apex of a cone or triangle. This practice has not been deviated from since that day.

The small cryptic abscesses require the same radical and complete drainage with excision of the infected crypts as the more extensive perianal infection.

I always try to impress upon the interns who are required to assist me the importance of a knowledge of and refreshing their knowledge of the ramifications of Colles' fascia and of the embryonic formation of the crypts of Morgagni and of the musculatures of the spaces which are successively involved.

The areas of involvement are along the lines of least resistance and the rapidity of the spread of these infections depends upon the virulence of the infection. Hence in some of these cases we find the localization of these infections in abscesses which remain as a comparatively minor affair for a longer period of time, whereas in other cases only a few days are required for the abscess to involve ischiorectal and superior pelvirectal spaces on both sides. When the latter occurs the abscess breaks through beneath the recto-coccygeus muscle and if there is any question in my mind whether this has occurred I always open the opposite side to make sure that adequate drainage is given. This requires only a few moments and will occasionally relieve the proctologist of the embarrassing necessity of a second operation. Some of the abscesses will appear quite high and would seem thus to a general surgeon to have their origin elsewhere than in a posterior crypt and it seems to be a practice quite generally followed by the general surgeon especially, to apply poultices or hot packs and to wait for these abscesses to become more superficial. This, in my opinion, is little short of pernicious and to the contrary when I can with the finger in the rectum palpate an abscess I operate upon the case as early as the patient gives consent.

One of my confreres when given a case of this kind to operate upon, made his incision and though entering the inflammatory area failed to see frank pus. I treat all perirectal palpable infections as emergencies and after making incisions I have oftentimes heard my assistant remark, "if he doesn't find an opening he will surely make one." The fact is the internal opening is always there and when I have opened the abscess and extended the incision around the anus to or near the posterior midline near to the coccygeus a bent grooved director will always enable the surgeon to find the internal opening if he knows where to look for it. If the abscess is anterior to a line drawn laterally through the anus, the infected crypt will be found in one of the anterior quadrants.

I am most patient in this procedure for we all know that unless the opening into the infected crypt is completely excised, including all the infected crypt, the operation will not cure the case. The most difficult among my cases have been those that have been operated upon previously from one to four times. In all of them a great deal of scar tissue must be excised and the muscles have either been cut in one or more places or are so bound down by fibrous structures that when the scar tissue is excised it would seem that incontinence would be inevitable, or the muscle has been divided on the bias which is productive of incontinence. In cases which have been previously operated upon, sometimes only extremely radical surgery will relieve the condition and make the patient comfortable.

One of the chief causes of failure and of unnecessary retractions and scar tissue formation I never encounter now, because I always excise all hemorrhoids and other infected crypts and all perianal thrombotic veins. A hemorrhoid which often gets larger after surgery of adjacent tissues will drop down into the surgical wound. I often compare this to a ball-in-socket joint. It will not allow the wound to approximate, it encourages retraction and prevents healing. This departure from the general practice is one of the points I wish to emphasize.

When I excise a fistula and there are extensive and deep surgical wounds I do not leave the wounds completely wide open as is the general

practice but with silkworm gut sutures I almost approximate the wounds and the ends of the sphincter muscle, leaving adequate space for drainage. This procedure I have never known others to practice except my assistants and students. These sutures are not removed for six to ten days. The longer I practice the less I irrigate, the less I pack, and the longer I have practiced the less scarring and deformity I have had so there must be merit in the procedures I have described.

The most extensive and virulent pelvirectal infection I have encountered during my forty years of proctologic service has been due to the injection treatment of hemorrhoids and it has been among these chiefly that I have found fistulous tracts and sloughs into the rectum elsewhere than previously described. In many of these cases I have seen all of the perirectal pelvic spaces and all their surrounding soft tissues destroyed. In one such case, my assistant, who had been a surgeon in the World War, tried to persuade me not to proceed with the radical surgery that was done because it was as typical trench gangrene as he had ever seen in France. In this case I cut out all of the necrotic structures that I could and filled the cavities with gauze saturated with a strong solution of formaldehyde to mummify the remaining dead tissue. This did no harm to the living tissue and saved the man's life.

I have not had incontinence or considerable scarring in any case that I have operated upon for years, and I believe, gentlemen, that this has been the result of the technic of complete surgery, and as you may be pleased to describe it, radical surgery, that I have been practicing.

Medical Arts Building

DISCUSSION (*Abstract*)

Dr. Granville S. Hanes, Louisville, Ky.—When Dr. Jelks said in his paper that the majority of troubles that occur in the terminal bowel are due to disturbances higher up in the alimentary tract he made a statement that is reasonable and indisputable. How can an infection get into the rectum unless it comes from above? Of course, cancers, ulcers, colitis, proctitis and pruritus are infections and are secondary conditions.

When patients come to me complaining of trouble in the terminal bowel, the rectum is the final part of the examination.

If the tonsils, teeth, sinuses, gallbladder, or appendix are infected, or any form of indigestion is present, any of these may divert the normal physiologic care of food taken into the digestive tract and thus encourage various types of fermentation. Various poisons and germ life grow more vicious as they pass down the tract. They remain in the sigmoid and rectum for a greater length of time than anywhere else in the tract. There is a radical difference in the effect upon patients when a perforation is made in the bowel in the upper or lower tract. Any abnormal condition in the tract above will affect the parts below, whether much or little.

I make stomach analyses to ascertain as best I can the kind of medicines and food my patients should have to effect as nearly as possible a normal condition in the entire alimentary tract.

A careful investigation of the abdomen may yield very important information.

The patient is turned on the left side; inspection is made of the parts; a digital examination is made, and lastly the patient is inverted and an examination is made of the rectum and sigmoid.

Not long ago I operated upon a patient for hemorrhoids. Twelve years previously he had been operated upon for ulcer of the stomach. He probably had no piles then, but sufficient disturbances had already set up in the tract below to lead later on to hemorrhoid formation. Or even after the stomach operation there might still have remained a defective digestion.

Dr. Jelks mentioned the importance of finding the internal opening in rectal fistula. We never search for an internal opening.

It is not difficult to dissect the fibrous fistulous tract to the anal wall where the perforations occur. If this is carefully done a gentle traction on the fibrous tract will release it from the anal wall. The tract through the anal wall is no more than a quarter or an eighth of an inch in extent. A little pure carbolic acid can be applied or an actual cautery can be touched to the outer opening, and, by the use of a bivalve speculum the internal opening can be lightly burned over. There are very few thus treated who will not make a complete recovery.

The important point in these cases is to avoid the destruction of the anal circle. Even if the perforation through the anal wall is not destroyed, the fistulous wound may heal up to the opening. The muscles can then be divided and there will be much less likelihood of incontinence than if the division was made at the time of the fistulous operation. In many patients, where the muscles have been divided, they may not have a great deal of trouble in the way of incontinence because they may naturally have a tendency to constipation. If, however, the patient has a tendency to loose bowels then he is in great trouble. When the patient who is inclined to constipation happens to have a loose bowel he is confronted with the same difficulty. So, I never divide the muscles when I operate for fistula if it can possibly be avoided.

Dr. Marion C. Pruitt, Atlanta, Ga.—Most of us are familiar with the phrase of Dr. Jelks "that almost all abscesses and fistulae are secondary to an infection higher up." I believe that most of the cases begin as a local infection, usually in the anal crypts, the posterior crypts being the most common, and spread through the lymphatics into the several rectal spaces.

In the past twenty-five years I have had much experience with the injection treatment of internal hemorrhoids, and I have yet to see a case of massive de-

struction of pelvic tissues as a result of injection treatment of hemorrhoids, as reported by Dr. Jelks. I have seen a few cases of slough of small areas of the mucosa of the lower rectum, but none of any grave consequence. All of them healed with little scar tissue and slight if any stricture formation, and no fistulae.

I cannot agree that an internal opening is always present in the abscess of the pre-fistula stage. If there is no internal opening, certainly one should not be made. The fact is that any abscess, before incision or spontaneous rupture, is a closed cavity, and should be treated as such.

In cases where the induration and tumefaction of the tissues are such as to bring up the question of an acute cellulitis or gas gangrene, it seems wiser to administer sulfanilamide in large doses and wait for localization. Often sulfanilamide gives almost immediate relief of symptoms and causes the acute infection to subside. An incision into such an infected area before pus formation may spread the infection.

To open an abscess in the acute stage and then proceed to do a radical operation for a fistula (cutting the sphincter muscles) will often leave a wide open wound, marked retraction of the cut ends of the sphincter muscle, followed by much scar tissue and a deep sulcus in the anus, and in some cases may cause a partial or complete incontinence.

In the pre-fistula or abscess stage the location, type and extent of incision to be made depends upon the location and size of the abscess at the time of opening. As a rule, the incision should be made lateral to the external sphincter muscle into the most prominent area of swelling or induration. Incision into an indurated area even before pus is formed may, at times, be advisable to relieve tension. The incision should be sufficient in length to give free drainage. To make a small stab incision into an abscess cavity and then plug it with gauze prevents drainage, causes pain to the patient, and is almost certain to be followed by a fistula.

When the abscess is large and there is marked swelling of perianal tissue, an anteroposterior incision, lateral to the sphincters, is made over the most prominent portion of the swelling across the entire width of the abscess. The finger is now gently introduced into the wound and the extent of the abscess cavity is determined. Then with scissors or knife the roof of the cavity is cut away and the incision is continued into the anus, over the sphincter, sparing the sphincter muscle and leaving a racket-shaped opening, the handle in the anus and as far back towards the posterior anal margin as possible. If a fistula should develop this will leave the external opening near the anal margin, shorten the tract, and aid in the later fistula operation.

In conclusion, after an anal, anorectal or rectal fistula has developed, failure to find all the internal openings, and to follow up all sinuses or tracts, is the most common cause of failure to cure.

Cases where the internal opening is high in the rectum and the tract is deep to the sphincter, muscles are often best treated by the seton method.

Whatever procedure is used, good postoperative care is essential for a cure.

Dr. Clement L. Martin, Chicago, Ill.—There is a tuberculous lesion at the anus which looks like a tuberculous fistula and is easily confused with it. This is tuberculous subcutaneous suppurative lymphangitis with one, but generally more than one skin orifice. I have been unable to find a description of this in the literature. On inspection it usually appears to be an anorectal fistula with multiple skin openings. But it differs from this in being a very superficial lesion, essentially a draining subcutaneous abscess, commonly fairly large, and having no internal orifice. If it is at the anal margin, as it generally is, only the skin with little if any subcutaneous fat covers it. On examination it is seen to be an area of undermined skin extending out from the anal margin involving more than one lateral quadrant usually and with two or more perforations like fistulous openings discharging thin yellow pus. The undermined skin may be darker than the adjacent skin. A probe inserted in any of the orifices can be swept around under the skin to communicate with any of the other openings. There is no definite fistulous tract running to or close to a crypt as there is in a tuberculous fistula, although the undermining may extend to or close to the pectinate line. There is neither internal orifice nor abnormal crypt.

Differential diagnosis is important to avoid unnecessary surgery. Excising a strip or ellipse of skin to include the openings is generally sufficient for adequate drainage. Healing occurs even with advanced pulmonary disease. It may be slow; this is to be expected. Suppurative perianal lymphangitis is relatively infrequent, its incidence being perhaps 1 to 50 or more tuberculous fistulae.

Dr. Jelks (closing).—I will not operate upon certain rectal cases with rotten pyorrhea, bad teeth or pussy tonsils. That would not be my practice in an acute abscess. Chronic cases that have perhaps been punctured two or three times and are draining will drain until doomsday unless they are properly operated upon.

No matter how many openings you have around the anus, the incision should be made circularly around the outer border of the sphincter muscle. Excise all of the scar and redundant tissue and fistula, including its internal opening. You will find the internal opening in the posterior crypt and if you do not do it that way you will have more trouble. As to the incision, I draw my sutures on the side, but I do not close them entirely. When I get through it does not look as though I had done one-half the amount of surgery that I have done.

I used to pack these wounds and irrigate and irrigate, and I had weeks and weeks of deformity and invalidism. I do not have it today. I keep the feces out of them and keep the cavities fairly clean, clean them once or twice a day, and I do not have the scarring and long invalidism and hospitalization that I used to have.

I see no reason to decapitate an abscess knowing that I will have to go back and hospitalize the patient to have the fistula operated upon and the hemorrhoids removed. Why not do it all at once?

LOCAL ANESTHESIA IN ANORECTAL SURGERY*

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All the various forms of anesthesia in use today are applicable to anorectal surgery, with the possible exception of those procedures which require the rectal instillation of the anesthetic, such as tribromethyl alcohol. However, even this has been used occasionally. Each form has its own group of advantages and disadvantages, its own indications and contraindications.

It is not intended in this paper to convince anyone that local is the best anesthetic for all anorectal surgery. Sometimes it is suitable; many times it is not. Local anesthesia has its limits and limitations, as well as its attractive features and good points. I do most of my work under local anesthesia, but I do not hesitate to employ other forms if the patient requests it, or if the condition of the patient contraindicates the use of local.

The term "local" anesthesia is applied to various forms. It may mean infiltration, conductive or block anesthesia, or topical application. At times, some refer to caudal or sacral anesthesia as local anesthesia.

I am going to outline briefly a technic which can be recommended for its simplicity, as well as its effectiveness, and for its safety as well as its rapidity of action.

The nerves supplying the anal canal, anus, perianal skin and external sphincter arise from the pudendal and coccygeal plexuses, which are formed by the anterior divisions of the sacral and coccygeal nerves. The principal nerves with which we are here concerned are the inferior hemorrhoidal, the perineal branch of the pudendal, a perineal branch which arises from the fourth sacral, and the anococcygeal. These nerves supply abundantly the anus and perianal regions and make necessary thorough anesthetization, if we are to avoid pain during the operative procedures.

Preoperative sedation is not an absolute necessity, but it is productive of so much good that we might well say that there is never any reason to start an operation without it in hospital work. My adult patients are given pentobarbital sodium, grains 3, one hour before, and morphia, grain ¼, with atropine, grain 1/150, thirty minutes before operation. This particular timing of the doses allows amply for the medicine to be effective before the local injections are started, and yet also allows for continued effectiveness during operation and for a considerable time thereafter. By its use, even the very apprehensive and nervous patients are calm and cool. It is not unusual to have the patient sleep part of the time.

Numerous drugs are used to produce local anesthesia. During recent years, many new ones have appeared on the market. Several are very satisfactory, and each has its advocates and boosters. Because procaine hydrochloride has given me excellent results over a period of years, I continue to use it in 1 per cent strength in an isotonic solution. Some claim the preoperative pentobarbital is an antidote to an overdose or to untoward effects of the procaine. In my hands, no unpleasant effects have occurred from its use, and in the literature procaine is generally referred to as one of the safest, if not the safest, drug at our disposal for local infiltration anesthesia. At this point, let me sound a word of caution regarding the use of cocaine. It is used by many eminent proctologists as a topical application in examinations of painful lesions about the anus, especially for digital and instrumental examinations in cases where there is sphincter spasm. However, never, never inject a solution of cocaine for infiltration or block anesthesia. It has been proven time and time again that this is a very dangerous procedure, and in many cases has resulted in the death of the patient.

The use of epinephrine in the anesthetic solution is a very much debated subject. It is well recognized and admitted that the addition of epinephrine causes a prolongation of the duration of the anesthesia, which in the case of procaine alone is very short, and it also greatly reduces bleeding during operation. Especially does it reduce capillary oozing. Some operators emphasize their desire to ligate all spurting vessels at the time of operation and not at 2 o'clock the next morning, and so they advocate the omission of epinephrine. I think this view attributes to epinephrine a greater vasoconstricting power than it actually possesses, especially if it is used in the weak dilutions which are the optimum strengths for the work we are considering. I advocate the addition of three minims of the 1:1,000 solution of epinephrine to each fluid ounce of anesthetic solution. The writings of those who use epinephrine show that three to

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five minims is the amount generally recommended. Epinephrine, three minims to the ounce, does not and cannot cause enough constriction of an artery or arteriole of any but the smallest size to prevent its bleeding enough to be seen during operation, and such bleeders can then be ligated or dealt with as desired. But the epinephrine does actually prevent capillary oozing, so that the real bleeders are readily seen and easily handled. This minimizing of the bleeding is especially useful in fistula operations, because it enables the operator more readily to discern pathologic tissue and openings to branches and side tracts, instead of the operative field being clouded or blocked with annoying bleeding and clots.

The syringes used for the injection of the solution should be of great enough capacity to reduce to a minimum the troublesome refilling of the syringe, as is the case when small capacity syringes are used. The Pitkin local syringe, with its self-filling or automatic refilling valve attachment, has been found to be satisfactory for our work. If ordinary type syringes are used, those of 10 c. c. or greater capacity should be the ones of choice.

A needle of 1½-2 inch length and No. 24 gauge is all that is needed for the complete injection of most rectal cases. However, for fistulae and cases involving dense scars and fibrous tissue, a stronger needle (22 or 21 gauge), may be necessary. Except as noted, the 24-gauge serves all purposes. It is small enough to cause a minimum of sensation on the first insertion or skin prick, and it is sufficiently strong to carry on with and complete the injections.

The needle is inserted about ¾ of an inch posterior to the anus in the midline, the exact distance varying with the presence or absence of external pathologic tissue that needs to be dealt with. Immediately, pressure is made on the plunger of the syringe, and henceforth is maintained at all times during any forward manipulation or movement of the needle, so that a constant stream or jet of anesthetic solution always precedes the needle point. Injection is sometimes made during slow withdrawal of the needle, but during the forward progress of the needle, injection always goes on concomitantly. The injections are made just under the skin. The needle is pushed forward, first to one side of the anus and then to the other, without actually withdrawing it from its first point of insertion. The point of the needle should be kept at all times about ½ to ¾ of an inch from the verge of the anus. The amount of solution injected should be sufficient to moderately distend the tissues, and is thereby spread out on each side of the needle point to a sufficient extent to include enough area for this step of the procedure. This subcutaneous infiltration bathes, so to speak, the subcutaneous nerve branches, together with the outer layer or superficial surface of the external sphincter muscle. This amount of infiltration will produce only a limited amount of relaxation, so it is preferable to supplement it with injections into the deeper portions of the sphincter muscles. Before completely withdrawing the needle, inject 5 c. c. into the space behind the posterior wall of the anal canal. This may be made the first step of the procedure, if desired. Then withdraw the needle. If the anatomy of the parts is such that the two lateral infiltrations do not meet properly in the perineum anterior to the anus, then introduce the needle anteriorly, as was done posteriorly, about ¾ of an inch from the edge of the anus, and infiltrate on each side in turn for sufficient distance to complete the circuminjection of the anus.

From here on, the technic varies according to the pathologic tissue to be removed. The tissues in and about a fissure, fistula, pedicle of a polypus, or hemorrhoids, are thoroughly infiltrated. I use the word "thoroughly" advisedly. By it I do not mean to the point of overdistention, but rather I wish to emphasize the important point that every spot in and about the anal canal and perianal tissues to be worked on, whether incised, excised, sutured, ligated, or clamped, is definitely infiltrated beforehand. Almost without exception, these last mentioned injections can, and should be made, through tissue which is to be removed during the operation. The careful observance of this point is well worth while because it will help to avoid infection, for if any is carried in on the point of the needle piercing the skin, the bacteria are removed with the tissue in which they are embedded.

One of the objections raised against this method of anesthesia is that it distorts the tissues, distorts the geography of the parts, as some are pleased to refer to it. If, in place of the word "distort," we substitute the words "changes the appearance," I will readily agree that it does. But, in my opinion, this, instead of being a hindrance or handicap, is a distinct advantage, especially in the case of hemorrhoids, because it brings them into a state of prominence

or bold relief, enabling the operator to recognize what should or should not be removed by operation. It does away with the need for the use of Biers suction cups or the injection of sterile water into the hemorrhoids, two methods sometimes recommended by textbooks for use by the occasional operator. Instead of being a disadvantage, this infiltration offers the further advantage of helping to make more distinct the lines of cleavage, and thus facilitates the removal of tissues overlying the sphincter with a minimum of damage to the muscle. Also, as previously mentioned, it minimizes oozing, and thus allows the real bleeding points to be easily located.

The most important objection raised against local infiltration anesthesia when used in any branch of surgery is the increased incidence of infection. It is claimed that this is due to infection carried in from the skin by the needle; to devitalization of tissues by the anesthetic solution; to traumatism to tissues by the needle, thus lowering resistance; to hematomas formed after vasoconstricting effects of the epinephrine pass off. Being cognizant of these causes, one should try to avoid infection by careful and thorough preoperative bathing and cleansing of the skin, together with suitable medicated applications, and puncturing the skin with the injection needle as few times as is practical, and, whenever possible, through skin to be excised. Devitalization of tissue is kept at a minimum by avoiding overdistention with solution and using isotonic solutions in which to dissolve the anesthetic agent. Traumatism to the tissues by the needle is avoided by always moving the needle in a straight line and never moving it like a fan with a side swipe. Hematomas are avoided by ligating all spurting vessels and by applying a tight or compression dressing for several hours postoperatively. A procedure that invites infection is for the assistant in refilling the local syringe to dip it deeply into the vessel containing the solution. This bathes or washes off contaminated material, if any is present on the barrel of the syringe. Obviously, this should be avoided. And lastly, a very big and important point in avoiding infection is the use of only those sutures necessary for hemostasis.

Careful attention to these points reduces the number of cases infected, and also the amount of infection in those who do become infected. The small amount of infection encountered is more than made up for by the many attractive features that local anesthesia possesses.

Long acting local anesthetics have become popular of late years, but have not gained universal recognition, some men feeling that they entail added risks of infection and, possibly, delayed healing of the operative wounds.[1] In 1934, Rosser[2] reported on the use of diothane in surgery of the anal canal in a clinical survey of one hundred cases. His conclusions were entirely favorable. Oil soluble anesthetics are widely employed in this connection because their slow absorption makes their effect last for an extended period of time. With their use great care must be exercised to avoid injecting too great an amount in any one area, to prevent the so-called pooling which increases the likelihood of abscess formation. These long acting anesthetics may be used in conjunction with local as well as other forms of anesthesia.

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DISCUSSION (*Abstract*)

Dr. Howard B. Williams, Birmingham, Ala.—The essayist has presented to us a simple and direct technic of obtaining anesthesia by local infiltration for the performance of anorectal surgery. However, in my hands local infiltration anesthesia has not proven satisfactory. I use it only for minor surgical procedures such as opening an abscess, excision of a polyp or papilla, splitting of a fissure or an ulcer, and so forth. In performing radical rectal operations I always insist upon some other type of regional anesthesia, providing there are no specific contraindications to its use.

I fall into that group which believes that minute, detailed and clean dissection is essential to gain good results in anorectal surgery. Therefore, I feel that the first principle of utmost importance is proper relaxation and adequate exposure of the operative field. I have not been able to satisfy this condition with the use of infiltration anesthesia. With complete relaxation an act of prime consideration in the causation of postoperative pain is avoided, namely: divulsion of the sphincter ani muscle with its traumatizing efforts.

Infiltration and distention of the parts with an anesthetic solution disturbs or distorts, if you wish, the appearance of normal as well as diseased tissue and in many instances actually obscures minute pathologic conditions. The traumatization of the deeper tissues by frequent needle punctures associated with many small hematomas and the infiltration of the solution results in a diffuse, though mild, inflammatory reaction and induration of the structures. This phenomenon retards healing, particularly if an oil solution has been injected, and is responsible for an increase in the amount of postoperative pain.

In the public mind, an anorectal operation is synonymous with unutterable and unforgetable pain. Because

of this unhappy fact, the public has sought a way out of a wilderness of fear and has fallen victim to various reassuring advertisements for painless rectal surgery. Serious consequences to the public welfare have resulted. The prevention of pain following an anorectal operation is, therefore, of prime consideration. This can be done with the use of a proper relaxing anesthetic and the attention to details of removing pathologic tissue.

Up until the past two years we had favored caudal anesthesia, using procaine hydrochloride. Since that time we have turned almost entirely to spinal anesthesia, using pontocaine hydrochloride, and let me say here that I do not wish to revive the old controversy regarding the relative merits of caudal or sacral versus spinal anesthesia. Our technic with pontocaine is simple, it is time-saving, it is safe and it provides instantaneous and complete anesthesia. We rarely use more than 5 mg. for the usual anorectal operation. This gives an anesthesia of one to one and one-half hours. We do not routinely give ephedrine or epinephrine, since as a general rule there is a slight rise (10 to 15 mm.) rather than a drop in the blood pressure.

We have not had nausea or vomiting on the table or afterwards and headaches have been extremely infrequent. There has not been a failure of anesthesia nor has there been any untoward after effects in a single case. The wary patient marvels at the ease and grace of the anesthesia and usually says that the experience was a delightful surprise.

Dr. Frederick B. Campbell, Kansas City, Mo.—Circumstances alter anesthesia. For a given case there is a particular type of anesthesia among those at our command which would be best. If all types of anesthesia were available, including general, spinal, caudal, local block, and local infiltration, each given with equal skill, we might eventually decide which was safest and most comfortable to the patient. As it is now, our choice of anesthesia is determined by the availability of a good anesthetist, our own experience in giving local anesthesia, and the whim of the patient.

If a patient flatly states that he wants general anesthesia, I do not argue the point unless there are definite reasons for doing so. If he respects my judgment enough to ask my opinion, I tell him that I believe local is best. My preference is for caudal block, which I have used for over fifteen years. Should the caudal block fail, as it does in less than 2 per cent of my cases, we still have local infiltration to fall back on.

As much as I should like to use spinal, I am still unconvinced of its safety and freedom from disagreeable after effects.

I believe the danger of infection from infiltration is overrated, provided the rules of asepsis are observed rigidly.

Dr. Lescale (closing).—We have not reached the stage of medical advancement where we have any one perfect anesthetic and far be it from me to claim local as a perfect anesthesia in all cases or even in the majority of cases. It has its objections, but most certainly relaxation or the lack of it is not a valid objection to the use of local except in cases of highly situated polyps, because if you work around an anal canal you can get not only all the relaxation you need, but also a lot more than you need to perform any intra-anal or rectal operation of the type mentioned in my paper.

INTRAVENOUS ANESTHESIA COMBINED WITH REGIONAL ANESTHESIA*

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From the earliest periods of civilization some form of analgesia has been known to man. However, it was not until after 1799 A.D., when Sir Humphrey Davy discovered anesthetic properties in nitrous oxide gas that any real progress was made in the development of the science of anesthesia. In 1831, chloroform was used in England to induce anesthesia. Chloroform was followed by the discovery of the anesthetic properties of sulphuric ether by Crawford W. Long, of Georgia, in 1842.[1] Many anesthetic compounds have been developed or tried in the constant search for a method of producing what may be called the ideal anesthesia. The ideal type of anesthesia is one that is safe and complete, from which the subject can quickly recover, associated with the minimum amount of psychic trauma during and after induction, and which is followed by the least possible number of postanesthetic and postoperative complications. From the large amount of work that has been done, using both new and old preparations, there have evolved two main methods of inducing anesthesia, namely: (1) the indirect method, by which anesthesia is induced by introducing an anesthetic drug into the respiratory system for absorption by the lungs, or by administering the drug through the gastro-intestinal tract. (2) The direct method, in which anesthesia is accomplished by depositing an anesthetic solution around the nerve tissues, or by injecting an anesthetic drug directly into the blood stream. Of course, there can be any combination of these two main methods. It scarcely seems necessary to add that no one type of anesthesia should be employed in all cases, and above all, the anesthetist should use the method which he can administer with the greatest safety under varying conditions.

Intravenous anesthesia was introduced first in 1872 by Ore, of Lyons, France, employing a solution of chloral hydrate. In 1905, Krawkow and his associates used "hedonal" and various mixtures with other chemicals. Other drugs, including alcohol, ether, chloroform and many

*Read in Section on Anesthesia, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

other preparations, as well as any number of combinations of various drugs, were also employed. These drugs proved to be inadequate or dangerous and properly fell into disuse.[2]

It was Zerfas and his associates[3] who revived the popularity of intravenous anesthesia and caused the barbiturates again to assume an important role in anesthesia. Very soon after Zerfas made his report, Lundy and Tovell[4] followed with a report on pentobarbital sodium. But these and other similar drugs proved to be far too toxic for surgical relaxation and, therefore, are undesirable for anesthetic purposes. General acceptance of intravenous anesthesia waned somewhat until 1932, when "evipan" was introduced from Germany by Weese and Scarpff.[5] At first, this was heralded as the ideal drug for intravenous anesthesia. Notwithstanding, in 1935, Lundy and Tovell[6] reported their experiences with sodium ethyl thiobarbiturate ("pentothal"). About this time the name "evipan" was changed to conform with American standards for drugs and was thenceforth known as "evipal soluble." Other drugs have been introduced and used as agents to induce intravenous anesthesia, but it is the general consensus in America that "pentothal sodium" is the superior drug with "evipal soluble" next. However, according to Findlay and Findlay,[7] only a few more than a hundred derivatives of barbital have been developed out of the possible twelve hundred compounds that might be synthesized; thus, it may be that the best drug of the barbituric acid group for intravenous anesthesia has yet to be developed.

I will discuss briefly the relative advantages of "evipal soluble" and "sodium pentothal" under varying conditions. Although "pentothal" is preferred in the majority of cases, "evipal" has a definite place in the field of intravenous anesthesia. "Evipal" is the drug of choice when intravenous anesthesia is necessary for patients who are taking, or who have taken, one of the sulfanilamides in the preceding few days. It has been said that a certain amount of sulfanilamide is stored in the liver, and when another sulphur compound is administered, irreparable or serious liver disease may follow from overdosage. As "evipal" does not contain a sulphur radical, it should be safer than "pentothal" to administer to patients in whom a sufficient time has not elapsed for the elimination of the sulphur derivatives taken previously (Lundy[8]). Usually, intravenous anesthesia is easily controlled when the fractional method of administration is employed, and in this respect it is like those drugs that are inhaled for anesthetic purposes.

It is unnecessary to review the many advantages of local anesthesia over other types, since this has been done in numerous articles by investigators in widely separated centers.

Regional anesthesia includes spinal, and spinal anesthesia offers the surgeon a safe anesthesia for operations below the diaphragm under ideal conditions. Many of the accidents that have resulted from the use of spinal anesthesia, I am sure, have been due to misapplication and to inexperience. Anesthetizing other areas or regions by injecting an anesthetic solution round the nerve tissues such as intercostal and lumbar nerves which supply the abdomen (abdominal block), the cervical and lumbar nerves (paravertebral block), the cords of the brachial plexus, including the radial, ulnar and median nerves (brachial plexus block), and the sacral nerves, including the sacrococcygeal plexus (sacral block and caudal block), is also a method of producing regional anesthesia. Any and all of these nerves can be blocked also by injecting an anesthetic drug in the epidural space (epidural or peridural block, Odom[9]). Regional anesthesia has its limitations, although it is yet considered, in the hands of those familiar with its uses and abuses, the safest type of anesthesia when it can be employed. Recently, Widenhorn[10] expressed the opinion that an ideal type of anesthesia could be obtained by a combination of intravenous with regional anesthesia. A combination of intravenous and spinal anesthesia is, in my opinion, the best that can be employed for operations upon those parts where spinal can be used.

When using a combination of intravenous and regional anesthesia, I give "pentothal sodium" intravenously and procaine hydrochloride intrathecally, or procaine hydrochloride injected around the larger nerve trunks, to produce the aforementioned anesthetic blocks, and into the epidural (peridural) space for blocking the nerves in any part of the body from the second cervical on down.

It has been routine on my service to use some form of preliminary medication prior to administration of an anesthetic drug, no matter how short or "minor" the operation may be. Employing the method recommended by Lundy,[11] when it is feasible, I give the patient pentobarbital, gr. 1½, the night preceding the operation, and again an hour preceding the operation. This is followed by morphine and atropine in suitable doses hypodermically about twenty min-

utes before the induction of anesthesia is to be started. In some cases I have deliberately omitted the administration of a narcotic to see whether there was any difference in the amount of respiratory depression following the administration of pentothal sodium as compared with those cases that did receive a narcotic. While I am not convinced, I am inclined to think that the patients who were given a narcotic had more difficulty with respiration during the period of anesthesia and were more inclined to be nauseated afterwards. This has been observed by Carraway and Carraway.[12]

The technic used for administering intravenous anesthesia is as follows: a Y-shaped tube is employed so that a normal saline solution may be given continuously (Lewis[13]). The rate of flow is regulated at about twenty to forty drops a minute, while a clamp is kept on the opposite arm of the Y-tube to which a 30 c. c. syringe containing the drug is connected by a piece of rubber tubing (*Figs. 1, 2*). About 1 or 2 c. c. of 2.5 per cent pentothal sodium is injected at intervals as needed, thereby conforming with the fractional method of administration suggested by Lundy.[11] During the periods of complete unconsciousness, we observe the respirations closely in order to prevent them from becoming too shallow (*Fig. 3*). It is frequently necessary to administer oxygen, especially if the color is not good or if the blood pressure drops too much.

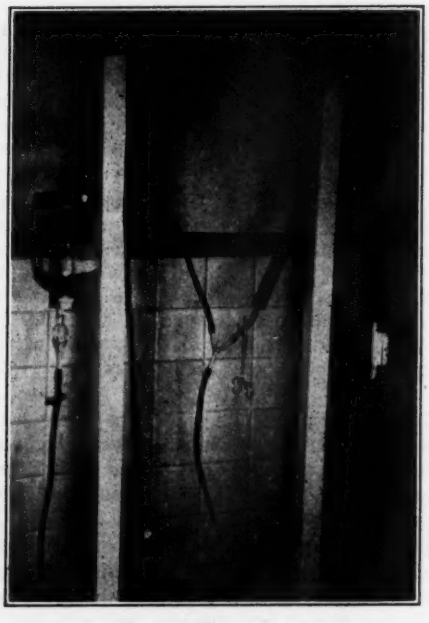

Fig. 1
Apparatus for intravenous anesthesia.

Fig. 2
Apparatus for intravenous anesthesia showing method of administration.

Fig. 3
Butterfly, to indicate depth of respiration.

When the anesthetic agent is administered in this manner, the patient is on the verge of awaking at all times, although anesthesia is sufficiently deep to prevent nausea, vomiting and retching. With a little practice, the approximately correct depth of anesthesia can be easily controlled. Relaxation having been obtained with regional anesthesia, the patient can thus be maintained in a state of partial general anesthesia by giving repeated, small doses of pentothal sodium.

The advantages of a combined intravenous and regional anesthesia, in addition to effecting complete relaxation and causing the elimination of nausea, vomiting and retching, are as follows: as a rule, the blood pressure does not fall a great deal, since either epinephrine, ephedrine, or some other vasoconstrictor has been administered simultaneously with the drug employed for the regional anesthesia. The intravenous infusion of normal saline solution during the period in which pentothal sodium is being administered also tends to prevent a great fall in blood pressure. A study of 267 cases in this series indicates that the systolic blood pressure in the average case of spinal combined with pentothal sodium, administered by the aforementioned technic, rises to about 7 mm. Hg. above the pre-anesthetic level during the first five minutes, then drops gradually until at the end of forty-five minutes from the beginning of the operation the average systolic blood pressure was 1 mm. Hg. below the original reading. During the next thirty minutes, from forty-five minutes to one hour and fifteen minutes, the systolic blood pressure ranged from 5 to 10 mm. Hg. below the starting blood pressure. After one hour and fifteen minutes the systolic blood pressure dropped to 20 mm. Hg. below the pre-anesthetic reading.

Shock seems to occur to a less extent when this form of anesthesia is used, because a vasoconstrictor drug is administered with the drug used to induce regional anesthesia, because an intravenous infusion of normal saline, dextrose, Hartman's or Ringer's solution is being given all during the procedure, and also, because for some reason when a general anesthesia is combined with a regional anesthesia, there is much less tendency toward shock than when the patient is awake.

Although the combination of intravenous and regional anesthesia in the attempt to find a better balanced anesthesia in many cases more nearly approaches the ideal than many of the older forms of anesthesia, in conclusion I must emphasize the fact that this, like each of the other methods of inducing anesthesia, is potentially dangerous, and that it should be administered with utmost precaution, and by anesthetists experienced in the use of spinal and intravenous anesthesias.

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DISCUSSION (*Abstract*)

Dr. Russell F. Bonham, Houston, Tex.—First, I agree with the giving of the intravenous glucose solution by Dr. Sibley's method. It is the same method that I use. But I want to say a word about giving oxygen. I do not believe there was much mention of that yesterday in Dr. Tuohy's paper, and Dr. Sibley also mentioned that he gives it only in case he thinks it necessary. I think it is a good idea to give it from the beginning and to give it continuously through the operation.

Unless you increase the oxygen too much, it will take very little or no more of the drug to keep the patient asleep, and it certainly prevents any ashen grey color or anoxemia's occurring during the anesthesia and the operation. It relieves the patient, the surgeon and the anesthetist if the patient stays a good color and the blood stays a good color throughout the operation.

I believe Carraway first advocated the idea of giving continuous oxygen. I think it is all right to give it by nasal catheter or by the mask and bag, whichever is most convenient.

I believe Lundy gives his patients, with the sodium ethylthiobarbiturate solution "coramine," metrazol or a similar drug. I prefer to give routinely to all cases at the close of the operation, whether they seem to be approaching shock or not, a small dose of "coramine" or metrazol intravenously as a precautionary measure. It certainly causes the patient to wake up more quickly, it counteracts the barbiturate, and if there is a delayed shock I think it helps to prevent it.

Dr. Merrill C. Beck, New Orleans, La.—Dr. Sibley has brought before us the idea of a balanced anesthesia, not in the sense of balancing two drugs with the same type of action, as ether and a gas, but of combining two drugs with different actions, one local and the other systemic or general.

I think that this is an excellent method to use upon a certain class of patients: those in whom the operative procedure is facilitated by the use of a regional analgesia and whose psychic make-up is such that they are very much disturbed when anything is done to them while conscious. This method is also applicable in patients whose poor physical condition demands that the least possible amount of toxic drugs be used. By giving small doses of each the toxic effect can be minimized.

Up to the present time in our hospital we have not deliberately used this type of balanced anesthesia. Rather we have used sodium ethylthiobarbiturate to supplement a regional analgesia which does not last as long as the operative procedure. Realizing that this is not too pleasant for the patient, I think that in the future we shall more frequently use the method described by Dr. Sibley.

Dr. Sibley (closing).—Dr. Beck mentioned the fact that some patients are of such a nervous temperament and disposition that the thought of a local or regional anesthetic is disturbing to them. They want to take an anesthetic that will quickly produce unconsciousness. This can easily be accomplished and still be compatible with the employment of combined regional and intravenous methods. One can administer just enough of the anesthetic drug intravenously, either in the operating room or in the patient's room, to allow the injections necessary to induce the regional anesthesia to be made. It should be pointed out that one should not attempt to force a patient to accept a regional anesthesia except in dire emergency where it is strictly indicated. I make it a practice never to give spinal anesthesia when the patient tells me he "doesn't want a spinal."

Dr. Bonham has said that he administers oxygen gas during the entire period of anesthesia, and I feel sure that this is a good precaution in deep intravenous anesthesia. The administration of oxygen gas during ethylthiobarbiturate anesthesia, however, makes it necessary to use larger doses of the anesthetic drug. Dr. Bonham also says that he administers "coramine," metrazol or picrotoxin at the end of the required anesthetic period. While these drugs do seem to act as stimulants, it is thought that caffeine is the best drug for this purpose. Oxygen gas is also a stimulant in sodium ethylthiobarbiturate anesthesia. Dr. Mousel, of the Mayo Clinic, informs me that this has been his observation and that substantiating evidence to this effect will soon appear in the literature.

DEATHS FROM ACUTE APPENDICITIS IN LOUISVILLE*

By GUY AUD, M.D.
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This report is concerned with the deaths which occurred in the hospitals of Louisville during 1939 as the result of acute appendicitis. The data is from nine hospitals and the cases were treated by approximately 135 different surgeons.

During 1939 there were admitted to the hospitals of Louisville 1,221 patients with a diagnosis of acute appendicitis. Of this number 1,161 were operated upon and 60 were treated conservatively. In most of the hospitals all cases admitted were operated upon. Of those treated conservatively 80 per cent were confined to two hospitals. The largest number of admissions of acute appendicitis to any one hospital was 285.

The mortality rate in the different hospitals varied from 13 per cent to 0.4 per cent. The latter was from a hospital having 212 admissions, 207 of whom were operated upon. There were no deaths in the hospital having only 3 admissions. Less than 10 per cent of the cases that died had autopsies. The causes of death given in this report are those appearing on the records and are subject to considerable error.

For purposes of statistical study the cases in which death occurred are divided into three groups:

(1) Acute appendicitis without perforation. This group includes those cases of acute appendicitis in which there is no abscess or peritonitis present.

(2) Acute appendicitis with abscess. In this group there has occurred perforation of the appendix with the infection definitely confined to a localized area.

(3) Acute appendicitis with peritonitis. This group includes those cases in which the appendix has perforated into the peritoneal cavity without localization of the infection. No distinction is or can be made between localized and generalized peritonitis.

As in other series of cases of acute appendicitis there were about three males to one female. Most of the cases treated were under 30 years of age, while the average of those who died was

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ADMISSIONS AND DEATHS

Hospital	Total Admissions	Operated	Deaths	Medical	Deaths	Mortality Per Cent		
						Surgical	Medical	Combined
No. 1	285	252	13	33	1	5.1	3.0	4.9
No. 2	212	207	1	5	0	0.4	0	0.4
No. 3	192	190	8	2	0	4.2	0	4.1
No. 4	157	142	7	15	2	5.0	13.3	5.7
No. 5	150	145	8	5	0	5.5	0	5.3
No. 6	146	146	4	0	0	2.7		
No. 7	53	53	2	0	0	3.7		
No. 8	23	23	3	0	0	13.0		
No. 9	3	3	0	0	0			

DEATHS

	Patients	Deaths	Per Ct.
Surgical	1161	46	3.9
Medical	60	3	5.0
Combined	1221	49	4.0

Table 1

36.7 years for males and 45.4 years for females. One-half of those who died were 40 years of age or older. It is likely the higher average age at death is due to delay in seeking relief, lowered resistance and the presence of degenerative disease.

AGE, SEX AND DURATION OF SYMPTOMS

Condition	Age	No. Patients	Per Cent
40 or over		24	50.0
20 to 39		12	24.5
19 or under		13	25.5
Males		38	77.5
Females		11	22.5
Average, males	36.7		
Average, females	45.4		
Youngest	7		
Oldest	70		

Table 2

An effort was made to determine what effect the administration of cathartics might have had upon the condition of these patients at the time of their admission to the hospital. Unfortunately, the records in some hospitals were incomplete, with inadequate histories, and in 36.3 per cent of the cases no mention is made of cathartics. In the cases in which the appendix had not ruptured it was definitely stated that a cathartic had been administered in 30.7 per cent and no cathartic given in 53.9 per cent. In those cases in which the appendix had perforated with abscess, 41.7 per cent had taken cathartics. One-third of those cases with perforation and peritonitis were known to have been given cathartics.

It would seem, from the figures above, that the layman has not yet learned the dangers of the pernicious practice of administering cathartics to persons with acute abdominal pain.

CATHARTICS BEFORE OPERATION

Condition	Cathartic Per Cent	No Cathartic Per Cent	Not Stated Per Cent
Acute appendicitis (not ruptured)	30.7	53.9	15.4
Appendicitis with perforation and abscess	41.7	33.3	25.6
Appendicitis with perforation and peritonitis	33.3	12.5	54.2

Table 3

The duration of symptoms upon admission in the cases in which the appendix had not ruptured averaged 2 days. In those with abscess the average was 8.5 days, while in those with rupture and peritonitis it was 3.5 days.

GENERAL SUMMARY OF DEATHS

	Duration of Symptoms, Days	Deaths	Per Cent
Acute appendicitis (not ruptured)	2	13	26.5
Appendicitis with perforation and abscess	8.5	12	24.6
Appendicitis with perforation and peritonitis	3.5	24	48.9

Table 4

Of the 49 deaths, thirteen (26.5 per cent) were in cases in which the appendix had not perforated. Why peritonitis should have caused the death of 4 of these cases is unexplained. Pneumonia and cardiovascular disease each was given as the cause of death in 3 cases. There was one death each from pulmonary embolism, streptococcic septicemia and heat stroke.

DEATHS IN CASES OF UNRUPTURED ACUTE APPENDICITIS

Case	Sex	Age	Duration of Symptoms, Days	Postoperative Course, Days	Cause of Death
1	M	69	2	6	Cardiovascular
2	F	40	1	10	Pulmonary embolism
3	F	37	1	2	Cardiovascular
4	M	51	2	4	Peritonitis
5	M	53	3	3	Pneumonia
6	M	34	2	14	Peritonitis
7	M	21	3	3	Pneumonia
8	M	52	1	5	Peritonitis
9	F	45	2	1	Cardiovascular
10	M	34	1	7	Strep. septicemia
11	F	54	2	6	Peritonitis
12	M	25	2	1	Heat stroke
13	M	21	3	3	Pneumonia

Table 5

A general summary of the deaths shows 36 of the 49 (73.4 per cent) to be due to direct complications of appendicitis. General peritonitis was the cause of death in 34 cases. Streptococcic septicemia and intestinal obstruction caused one death each. Pneumonia was the chief cause of death from extra-appendical complications. Cardiovascular disease and pulmonary embolism were also leading causes of death in this group.

CHIEF CAUSES OF DEATH

Cause of Death	No. Cases
Direct complications of appendicitis	
Generalized peritonitis	34
Septicemia	1
Intestinal obstruction	1
Extra-appendical complications	
Pneumonia	5
Cardiovascular	3
Pulmonary embolism	2
Tubercular meningitis	1
Heat stroke	1
Toxemia	1

Table 6

COMMENT

During the year 1939 there were admitted to the hospitals of Louisville 1,221 cases of acute appendicitis, of which 1,161 were operated upon with a mortality rate of 3.9 per cent. Sixty cases were treated conservatively with a mortality rate of 5 per cent. Approximately two-thirds of the total admissions were cases in which the appendix had not ruptured; yet, among this group, there were 13 deaths. Recent reports of studies based on similar groups of cases such as those reported by Miller,[1] in which 629 children, in whom the appendix had not ruptured, were operated upon at the Cook County Hospital without a death. From Johns Hopkins Hospital, Stafford and Sprong[2] report 838 cases of acute appendicitis, without perforation, operated upon without a death.

Why this excessively high mortality should occur in cases of uncomplicated acute appendicitis is difficult to understand. It should be borne in mind that in this particular series of cases they were operated upon in nine different hospitals by approximately 135 different surgeons of varying degrees of judgment and skill, with many different technics, and, in some instances, inadequate preoperative preparation and postoperative treatment.

Twelve of the 49 deaths (24.6 per cent) were in cases of perforation with abscess. In 11 of these cases the appendix was removed and in 9 of them peritonitis was given as the cause of death. It would seem from this that a more conservative course of treatment or better surgical technic might have resulted in saving the lives of a large proportion of these patients.

Practically one-half (48.9 per cent) of all deaths occurred in the cases of perforated appendicitis with peritonitis. It is probable that some of these patients might have been spared by more adequate preoperative preparation, with restoration of the electrolyte and fluid balance, replacement of lost plasma protein by means of blood transfusions, relief of distention with a Miller-Abbott tube and more intensive postoperative observation and treatment.

CONCLUSIONS

(1) Of 1,221 cases of acute appendicitis admitted to nine hospitals in Louisville during 1939, under the care of approximately 135 different physicians and surgeons, 1,161 were operated upon with a mortality rate of 3.9 per cent. Sixty cases were treated conservatively with a mortality rate of 5 per cent.

(2) A study of the records of the cases that died leads one to conclude that some of these lives might have been saved by more careful preoperative examination and preparation, a better selection of time for operation, a different type of operation and technic and more intensive and better postoperative treatment.

(3) In some instances the case records were wholly inadequate. This is particularly true of the history and physical examination. Description of the operation and operative findings were frequently found to be too brief and to omit important items. The records of postoperative course and treatment were often scant or absent. In 90 per cent of the deaths no autopsy had been done to determine the exact cause of death.

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THE MEDICAL TREATMENT OF HYPERTENSION*

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For the past few years most papers dealing with the question of hypertension have emphasized the fact that this malady is responsible for 15 per cent of all deaths past the age of 50. Stressed also has been the statement that heart failure, cerebral hemorrhage, coronary thrombosis and so-called Bright's disease account for over 500,000 deaths a year in the United States. This is four times more than cancer, twenty times that of diabetes and tuberculosis. However, the situation has been very similar to that of Mark Twain and the weather croakers: "Everyone talked about it, but no one did anything." While this assertion may not be entirely valid, there was no planned attack such as has been made on pneumonia, tuberculosis, or syphilis. Had it not been for the occasional investigator, or at times small bands of courageous souls, hypertension would be progressing unmolested, claiming its toll, no effort being made to fathom its problems. Why has this been? Was the ultimate outlook for a real solution more dismal than in carcinoma, where millions of dollars have been spent in research? Undoubtedly the complexity of the approach to the problem has deterred or confused many. It is only within recent years that real progress has been made; and the greatest advances have occurred in the past year. Too much credit cannot be given Goldblatt[1] for this sudden awakening, after years of apparent lethargy. In 1933, by means of clamps on the renal arteries of dogs, with the subsequent production of hypertension, he evolved the conception that renal ischemia is the cause of the disease. At last an experimental animal was found to be used in clinical studies in whom pathologic and clinical progress could be followed. The vistas that were opened up by this experiment have been manifold; a whole new interest was created.

Attempt at classification followed; and, as might be expected, they are somewhat at variance. Scott[2] divided clinical hypertension into two groups: renal and nonrenal, with many subdivisions. Essential hypertension he included under renal types. Page[3] divides it into renal, cerebral, cardiovascular, endocrine and unknown, including essential and malignant under the unknown group. It is essential hypertension that I intend to discuss today, the condition that is found in 85 per cent of all cases exhibiting elevated blood pressure. How does one arrive at this particular diagnosis? It is important to be able to take a proper history, make a careful physical examination, do the necessary laboratory tests to help differentiate the various types of hypertension and decide in which group the patient belongs. A carefully taken history may be the solution to the problem; a family history of elevated blood pressure, of coronary disease, cerebral hemorrhage, or uremia, is common. The story of previous infectious diseases, with or without definite renal infection, may point to a pyelonephritis. Besides a general physical examination, the patient should have a specific survey from the standpoint of the cardiovascular system, including eyeground studies as well as exhaustive studies of the heart. The most intensive study must be applied to the kidneys themselves; several single specimens of urine should be examined and kidney function tests performed. The simplest of these is the specific gravity concentration test. Next, and probably best to determine the extent of renal damage, is the urea clearance test. Phenolsulphonephthalein to determine tubular efficiency, or the inulin clearance to determine glomerular status, may be done. Blood chemistry studies,

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especially the nonprotein nitrogen, blood urea nitrogen, and creatinin, are valuable. Intravenous pyelography has been of tremendous aid in helping solve the problems of this group. At times, the flat plate made before the test begins will tell the story. The size of the kidneys can be seen and any great variations noted. The presence of adrenal gland tumor may be suspected by an increased distance between the diaphragm and upper part of the kidney. By the intravenous pyelogram the size and distortion of a renal pelvis due to disease or calculus may be spotted or the presence of enough mobility to cause "orthostatic hypertension," recently reported by McCann.[4] Displacement due to adrenal tumor may also be seen. The examination in itself is an excellent differential renal function test in the hands of a careful, observing roentgenologist. Perirenal air injection should be mentioned, but it is not without its dangers and should be used rarely on the exceptional case, by an expert.

Brilliant results have been reported in several cases of nephrectomy in which unilateral kidney disease was present. These have been mainly in chronic pyelonephritis with destruction of renal parenchyma with marked arterial involvement. In the five cases reported by Barker and Walters,[5] marked arterial as well as arteriolar thickening was present. Similar improvements have followed the removal of the so-called Wilms tumor in children, in partial obstruction of the renal artery due to external pressure, and in renal infarction.[6] Schroeder and Fish[7] list the following criteria for selection of cases: (1) The onset of arterial hypertension should be known to have occurred recently arbitrarily placed at two years. (2) The renal lesion should be confined to one kidney and should be of such a nature that diminution of function has occurred in that kidney. (3) Renal function, as measured by the ability of both kidneys to concentrate urine, and by the test of the clearance urea, should be within normal limits. (4) Retinitis should be absent, and changes in the caliber of the vessels of the retina minimal. (5) Arterial pressure should be persistently elevated. Intravenous pyelography or retrograde pyelogram is not without danger in kidneys of poor function. The importance of having the other kidney healthy in order to get desired results is apparent. Even under these circumstances there have been several cases reported with unsuccessful results.[8]

What of the case that has been studied as outlined above with no positive findings but hypertension, the commonly called "essential hypertension?" What is the best method of handling this problem today? A great deal has been written about the psychic approach. Robinson[9] recently said that most cases of hypertension are probably central in origin, the elevation of pressure being due to emotional factors: fears, conflicts, and so on. He concluded that "Psychotherapy will probably become the most important factor in the treatment of hypertension and its wide use is to be encouraged." H. J. Stewart[10] has stressed what might be called the common sense plan of approach: a simple diet (a reducing one if the patient is overweight), no tobacco, moderate indulgence in alcohol, individualized exercise, and sedatives if necessary. Mental ease is important and at times a whole new pattern of life must be set up. Busy men must be taught to crowd years into their lives in place of life into their years. Long hours of sleep, frequent short vacations, an afternoon nap, business and home worries removed, are essentials. Above all, as a group, these patients need reassurance and must be discouraged from having their whole outlook on life colored by the reading of a mercury manometer. Hobbies are diverting and relieve tension.

I subscribe to all this and utilize it. Occasionally, in my hands, unexpected results have been obtained. More often, little or no benefit ensues. What then? Mosenthal[11] recently asserted in a paper on "The Medicinal Treatment of Hypertension" that

> "The main object of the treatment of hypertensive states is to lower the blood pressure and maintain it at a level which will not result in the secondary changes that are often the cause of death when the blood pressure is persistently elevated."
>
> After listing all the drugs that are commonly used, he summarized as follows: "Since there are no means by which an elevated blood pressure can be appreciably and consistently lowered, the medical treatment of hypertension has resolved itself into the establishment of the most perfect physical and mental control of the patient; in this therapeutic scheme, drugs are important for the achievement of the utmost results."

For ten years I have used potassium sulphocyanate in the treatment of selected cases of "essential hypertension." The drug was first used by Pauli in 1903, but the first American report was made by Nichols[12] in 1925. He conducted animal experiments and observed that cyanates are excreted slowly, very slowly at times. He did not understand the mode of action, but did describe the toxic effects. For years the drug was looked at askance, largely

because its use was not understood and because of severe toxic reactions that appeared at times. An editorial[13] in the *Journal of the American Medical Association* as late as June, 1940, says: "Because of dangerous possibilities from the use of the drug, its value seems more doubtful than ever." In recent years its importance has been stressed by Herbert Barker,[14] of Chicago, and a group at the Peter Bent Brigham Hospital. Barker added a factor for safety in recommending estimation of the cyanate content of the blood, describing a method for the determination. This has recently been greatly simplified by Ravin.[15] Barker feels that the concentration of from six to twelve milligrams per 100 c. c. of blood reduces the chance of toxic reaction.[16]

My own experience in approximately 200 cases treated with this drug has taught me that the optimum level of concentration must be individualized. Many patients will be controlled with a level of 3 mg. per cent and I feel that it is probably safer if the concentration in the blood does not exceed 8 mg. per cent, although I have seen patients who tolerated 12 mg. per cent comfortably. The important thing is to make frequent observations, every week or ten days, until the concentration is stabilized, and then the interval may be prolonged. Drops in systolic pressure from 30 to 80 millimeters, and the diastolic from 20 to 40 millimeters, are not uncommon. With this frequently comes relief from some of the unpleasant symptoms such as dizziness, head noises, tinnitus, headaches, palpitation, and insomnia. Blood pressure readings should be carefully followed when the patients are first started on the drug because if the fall in pressure occurs rapidly, unpleasant sensations will follow. The most common complaint is that of weakness, but this usually disappears as the adjustment to the fallen blood pressure takes place. Undoubtedly most hypertensives have an optimum pressure; above this they have the unpleasant sensations of hypertension; below it, the sensation of weakness. Relief from distressing symptoms is striking at times. Within the past year I have observed a man who, when his systolic pressure gets between 180-190, has attacks of aphasia. On potassium sulphocyanate, his systolic pressure can be kept between 150-165 without evidence of the attacks. A woman of 68, when her systolic reached 170 had muscular twitching of the right side of her face and inability to talk. Sedatives and psychotherapy did nothing for her. With potassium sulphocyanate her blood pressure could be kept at 145-160, with no attacks. The question of its use in angina pectoris has been debated, some men thinking the drop in blood pressure might increase the heart muscle ischemia. My own results in this group have not been striking, although I have under observation now a patient who has definitely fewer attacks with his blood pressure in the lower levels. The dosage that I have used has been to give 3 grains three times a day for the first few days, watch the effect, and then decrease the dose to twice a day for 10 days to two weeks, carrying most patients on one dose of 3 grains each day. There are a few cases that either due to poor absorption or rapid elimination, will require two doses a day to maintain an adequate blood cyanate level.

A great deal has been written concerning the toxicity of the drug and much prejudice has been aroused. Apparently there are some people who have an idiosyncrasy to this, as some do to quinine, aspirin or sulfanilamide. The first toxic manifestation to appear as a rule is a diffuse, red, itching rash, in all respects a toxic erythema which at times is accompanied by fever and dry tongue. The itching may be intense but stopping the drug, forcing fluids and applying a mild antipruritic lotion usually clears the condition in 48 hours. Dermatitis exfoliativa has been described, but I have never seen it. Patients are always warned to stop the drug on appearance of a rash. Aphasia and hallucinations of sight and hearing are also described. A patient, a malignant hypertensive 40 years old, showed jerky muscular movements of the hands and increased deafness while taking the drug, which cleared when it was stopped. A few patients at times have showed a slow progressive secondary anemia, due to the drug, which cleared upon its discontinuance. Pertaining to this, it is interesting to note the work of Doles[17] who believes that hypertension may be associated with macrocytosis and that cyanates act by reducing the number and size of the red cells. He warns against using the drugs when the cells are normocytic.

In the literature there are probably a dozen authentic deaths from the toxic effects of the drug; undoubtedly a great majority caused by overdosage. Garvin[18] reports a case in which the patient received 135 grains in 15 days who developed hallucinations, coma, and died. This type of case is undoubtedly the exception. Massie, Ethridge and O'Hare,[19] and more recently Robinson and O'Hare,[20] reported favorably their results from Peter Bent Brigham Hospital. They restrict the use of cyanates to pa-

tients who have had no previous angina pectoris, congestive heart failure, cerebral accidents, or significant renal failure, and who are not over 60 years of age. They advocate weekly blood cyanates and stop the drug upon the appearance of anemia or "cabbage goiter." They have seen no cases of coronary or cerebral thrombosis appear after fall in blood pressure. In the case of an elderly patient, the blood pressure dropped from 250/120 to 160/90 and angina pectoris occurred. At times the reverse occurred and they feel the drug is well worth trying in hypertensive angina pectoris. The mechanism of the drug's action will not be discussed here. I can not agree that patients over 60 years of age should not be treated with the drug as I have obtained some striking results in people between the age of 60 and 70.

Potassium sulphocyanates is not an ideal drug because at times without apparent reason, it is ineffectual. Then again, in order to produce adequate reduction in blood pressure, it is necessary to increase the dose up to the point where it becomes toxic and hence cannot be used; but there is a large group of people who, if adequately studied and carefully watched, will get benefit from its use. This is particularly true of the young hypertensive in whom prolonged reduction of blood pressure will undoubtedly prevent many arteriolar changes which produce such serious consequences in the fourth and fifth decade. It is the old story of not having "a better 'ole" at the moment. On the horizon it looks as if a sounder, more physiologic approach to the problem is approaching, where the risks may be smaller and the effect more striking.

I refer to the monumental work that has been done in this country in the past few years by a group of enthusiastic workers, chief of whom are Goldblatt of Cleveland, Page[21] of Indianapolis, Harrison[22] of Nashville and Grollman[22] of Baltimore. Goldblatt originally showed that the hypertension of renal ischemia was not due to renal insufficiency, but to a pressor substance liberated into the circulation acting independently of the central nervous system, to increase peripheral vascular resistance. Page, by means of a cellophane or silk membrane placed about the kidneys of dogs, produced a perinephritis which formed a fibrocollagenous hull. This constricted the renal parenchyma, causing hypertension as satisfactorily as constriction of the renal artery.

In 1898, Tigerstedt and Bergmann obtained a protein-like substance from normal kidneys which when injected intravenously produced a rise in arterial pressure, which they called "renin." The type of pressor action exerted by renin has been the subject of extensive investigation. It was found by Page that in order to maintain its pressor effect it was necessary to supply the renin with renin activator, a protein-like substance in plasma and red cells, as this was soon exhausted from the circulation of perfused animals. He isolated the combination of renin and renin-activator, called it angiotonin, and found that when injected intravenously it produced a sharp rise in blood pressure. It too, however, must have an activator, a substance found in serum and red cells, thought to be a different substance from renin activator, as exhaustion of the renin-activator in blood abolishes the response to renin without abolishing the response to angiotonin. Substances that inhibit the action of renin and angiotonin seem to originate in the kidney, for the action of these two substances was definitely increased by bilateral nephrectomy. Page feels that hypertensive animals may not only have increased amounts of activators in their blood, but reduced amounts of inhibitors as well, and that experimental hypertension, due chiefly to the kidneys, is "mediated by the renin-angiotonin vasopressor system." He felt "that the removal of the kidneys abolishes the source of a substance which inhibits the vasopressor action of angiotonin and renin." With this as the background, Page set out to find some substance to reduce the pressure in experimental hypertension. He used a variety of extracts of kidney and muscle, finding the filtrate from the iso-electric precipitation of saline extract of the kidney the most effective. He gave it by intramuscular injection in both hypertensive animals and humans and obtained striking results in both malignant and essential hypertensives. He feels the injections "reduce or abolish the ability of the plasma to activate renin and angiotonin. This may be interpreted as either reduction in the amount of activators or increase in the amount of inhibitors."

Page soon will publish a clinical paper in the *Journal of Experimental Medicine* entitled "Reduction of Arterial Blood Pressure of Hypertensive Patients and Animals with Extracts of Kidneys," a most remarkable contribution. The description of the changes occurring after injection of the extract in dogs is almost unbelievable. Animals with malignant hypertension, blind, weak, with bloody diarrhea, practically *in extremis*, had their vision restored at times

and remained in good health as long as the extract was given. The improvement in the human patients was even more dramatic. After injection, a marked rise in pressure occurs, due to the renin present, then a gradual fall occurring only after several days of treatment. It is interesting to note that it takes the yield from 700 to 1,000 grams of fresh kidney daily for several weeks to relieve the hypertension in the human. He reports 6 patients with essential hypertension all improved; as well as 5 with malignant hypertension, 3 definitely improved, and 2 dead. One of the patients who died had an urea clearance of 5 per cent, his blood pressure was reduced and death occurred in uremia. Page feels that this treatment is of value, but warns that it is still in the experimental stage.

Independently, Grollman, Williams and Harrison produced another kidney extract which they administered by mouth to experimental animals as well as hypertensive patients which caused a fall in blood pressure. When fed to normal animals, no fall occurred, but the pressor action of renin could be partially inhibited. The authors take a very conservative attitude toward the whole subject.

At long last it looks as if the investigative work on hypertension is leading somewhere. Whether these substances can be produced in sufficient quantity to be universally used after proper standardization, is another matter. It will take more investigation to isolate specific substances which possibly may be synthesized.

Finally, Weeks, Steiner, Mansfield and Victor[23] have just reported the results of their work on the effect of spleno-renopexy on dogs made hypertensive by the Goldblatt method. They found that the operation lowered the systolic pressure on each of 9 dogs with bilateral renal ischemia as long as 9½ months. When the spleno-renopexy was removed by operation, the hypertension returned. The operation produced a collateral circulation between the splenic sinusoids and the capillaries about the renal tubules. No collateral circulation to the glomeruli could be demonstrated, suggesting

"that in dogs with renal ischemia the lowering of the blood pressure by means of collateral circulation may be due to neutralization of pressor material or the inhibition of its formation or to both processes in the tubules of the kidney. In other words, they indicate that if pressor substances are formed in the kidney due to ischemia, they are probably formed in the renal tubules."

It looks as if hypertension, long a thorn in the side of the profession, may be removed from its lofty place in the mortality statistics in this country. Finally something is "being done about it."

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THE GASTRITIS PROBLEM*

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As you will understand from the title, the object of our paper is to place before you only a discussion of the problem of gastritis. Available knowledge will not permit us to do more.

For years we have believed that the mucous membrane of the stomach becomes diseased, but the earlier postmortem observations gave us no incontrovertible evidence on this score. For many years it was not possible to place any fundamental clinical evaluation on the results of necropsy specimens, as there was always the uncertainty as to how much of the change was produced by postmortem enzymatic action. Con-

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sequently the study of the clinical status of gastritis lagged due to lack of adequate methods for its pathologic investigation.

In the later years of the Nineteenth and earlier years of the Twentieth Century the studies of Knud Faber put the investigation of the subject on a sound basis and, for anyone interested in the subject, a perusal of his series of lectures[1] given in New York and published in book form in 1935 will be stimulating.

He prevented postmortem gastric changes in the human cadaver by the intragastric and intra-abdominal injection of formalin as soon as the heart beat and respiration ceased. In a large group of varied cases he was able to prove that very definite changes could occur in the gastric mucosa. He demonstrated swelling, round cell infiltration, edema, erosions (mutiple or single), hypertrophy and atrophy of the mucous membrane. By reference to the clinical history of the patients, he felt that he was justified in correlating the symptoms and gastric changes found in certain individual cases.

His work has been corroborated and continued by a number of men, among whom Konjetzny[2] and Simpson[3] have made valuable contributions to our knowledge of the pathology of gastritis.

These reports have brought the study and discussion of gastritis back from the limbus and, with the addition of the recent gastroscopic observations of numerous investigators, have made it a very live one. Since the introduction of the Wolf-Schindler gastroscope has made the technic of gastroscopy a simple as well as a safe procedure, an increasingly stimulated study of intragastric disease has followed. We feel that the enthusiasm of some of the gastroscopists has permitted the concepts of the study to get out of hand and it is mainly to this phase of the subject that we wish to direct ourselves today.

The earlier students, Schindler,[4] Henning,[5] Moutier,[6] Korbsch,[7] Gutzeit,[8] Rachet[9] and others, have observed a large number of patients and, as a result of their studies, some fairly concrete classifications and descriptions of gastritis have been advanced. A large number of these earlier students are united in believing that gastritis, as defined by them, is a common ailment. Schindler[10] says that only 22.2 per cent of the stomachs examined by him were normal. Several observers report that a large proportion of the patients studied by them have gastritis. The incidence varies from 35 to 50 per cent.[11] Even when one realizes that most of the patients whom they studied were suffering from some type of gastro-intestinal disorder, it is a little startling to anyone to be asked to believe that so large a percentage of such a symptomatically diversified series of patients has gastritis.

An an example of this school of thought we may select Dr. Schindler, who has been responsible for much of the growing interest in gastroscopic studies. As a result of years of observation and study, he[12] feels that we are justified in classifying gastritis into three main groups:

Superficial	(12a)
Hypertrophic	(12b)
Atrophic	(12c)

His criteria, and they are generally recognized, for the establishment of superficial gastritis are:

(1) Reddening of the mucosa, a phenomenon which usually occurs in patches.

(2) Edema, at first hard to recognize. The expert sees evidence of swelling, increased moisture, and an increased number of highlights.

(3) Exudation, the most characteristic sign of superficial gastritis. These initial changes are often accompanied by erosions, hemorrhages and pigment spots. According to him, the demonstration of changes which he feels are indicative of a superficial gastritis is of common occurrence.

As characteristc of hypertrophic gastritis he says:

"The first sign of beginning hypertrophy is the velvety appearance of the mucous membrane. It appears slightly swollen, dull, loose and sponge-like. The highlights are diminished or completely absent. The changes * * * appear at first in the valleys between the folds * * * small dark creases run through the dull swollen mucosa. The formation of granular nodules, larger nodules, and big nodules can usually be observed. When the mucosal folds are affected they become irregular and are subdivided by perpendicular creases. * * * In the very late states there may be tiny new folds, exceedingly stiff and short, which cannot be flattened out and hence which never disappear."

He and other competent observers agree that this form of gastritis is seen much more infrequently than the superficial.

The third type of gastritis, the atrophic, may follow from a superficial gastritis or be found in association with deficiency states.

"The most conspicuous feature is the thin mucosa, gray, or very often greenish-gray, in color. * * * Hemorrhage into the mucosa seems to occur more easily in the atrophic form than in any other type of gastritis. Small superficial erosions occur."

The mucosal folds in atrophic gastritis are probably less numerous than in a normal stomach and they disappear more quickly when the stomach is inflated.

We do not question the observations of the gastroscopists who feel that gastritis is found in a large percentage of the patients whom they have observed. There are, however, numerous factors that make us wonder whether the observations described are sufficient to justify a diagnosis of gastritis.

From various clinics in the country have come reports that there is a striking lack of symptomatology to be found in association with gastroscopic patterns which have been labeled as one or another of the sub-groups of gastritis. There is also increasing evidence that patients who do not have peptic ulcer or gastric carcinoma, but who have symptoms that might logically be considered of gastric origin, seldom show definite evidence of mucosal change on gastroscopic study. In our studies in Baltimore we have noted this same dissociation between symptomatology and gastroscopic findings.

At the Sinai Clinic,[13] where gastroscopic and subsequent histopathologic studies were made, little correlation could be observed between the two methods. Positive gastroscopic evidences which were characteristic of the commonly accepted criteria for the diagnosis of gastritis were found in patients whose biopsy specimens (usually obtained at operation for peptic ulcer or carcinoma) revealed normal mucous membranes. The converse of this was true also. Rare were the cases in which the diagnosis of gastritis was made both by gastroscopy and by histologic study. It is interesting to speculate upon the influence that operative procedures may have in causing changes in the mucous membrane. Schindler, Necheles and Gold[14] feel that they do have a positive influence and that they produce changes similar to those found in postmortem specimens.

The observations of Dr. Ruffin[15] on the changes produced in the gastroscopic picture as a result of increasing or decreasing the amount of inflation are important. His careful work has been a source of interest to us, for it may lead to a partial explanation of the difference between symptomatology and findings. If simply by sufficient inflation an appearance can be produced in the gastroscopic picture that is suggestive of atrophy of the gastric mucosa, one must reconsider the criteria which at present are usually deemed essential for the diagnosis of atrophic gastritis. We have seen the flattening of the rugal folds and the appearance of vessels in the mucosa with increasing inflation as Dr. Ruffin has described. However, we have not entirely simulated by this method the true gray or greenish-gray of a real Schindler-labeled atrophic gastritis.

In the early enthusiasm of gastroscopic studies the demonstration of what was considered to be organic changes in the mucous membrane and, therefore, diagnostic of gastritis, was considered a boon to a much maligned group of patients, the neurotics who presented gastric symptoms. Here, believed some investigators, was the cause of their symptoms, a gastritis. As is well known to you, there is a group of patients whose symptomatology is strongly suggestive of peptic ulcer, but whose x-ray studies have been negative. In the past they have been classified as psychoneurotics. It would be of great value if they could be shown to be suffering from a gastritis (presumably a hypertrophic gastritis), if we have a treatment for hypertrophic gastritis, and, furthermore, if the gastritis is not a reaction of the stomach to psychic insults.

We, as others, have noted at times changes in the gastric mucosa of some of these patients. They are changes which might possibly be the cause of their symptoms, and the patients are, perhaps, better under treatment. Also in a small number of these patients ulcers have been noted on gastroscopic study that were not noted on x-ray films. But there have been a large number with the same symptoms, whose gastric mucous membranes showed no changes similar to those which have been described as manifestations of gastritis.

There is another large group of individuals whose symptoms are not characteristic of peptic ulcer, but in whom the complaints might suggest a disturbed gastric mucous membrane as their basis. When those patients were studied by gastroscopy, a proportion of them was found to show changes in the mucous membrane. It was easy in the first enthusiasm to aver that their symptoms were caused by these changes. It is very difficult for us now to make the same assertion, and we believe that those who do so are apt to be unduly enthusiastic.

Recall for a moment that 35 to 50 per cent of the patients observed by several competent gastroscopists have been diagnosed as having gastritis. These studies were made on a group of patients suffering from symptoms which might suggest a disordered gastro-intestinal system as

their origin. Of all the patients observed by one investigator[10] a small proportion, 22.4 per cent, were reported as normal, 41.8 per cent were said to show signs of gastritis, and the remainder were diagnosed as suffering from such gross pathologic conditions as ulcer or carcinoma. It is fair to assume that the various series examined by the gastroscopists contained a goodly proportion of patients whose symptoms have generally been considered to arise from a psychogenic basis. Certainly any sizable group seen by most gastroenterologists would be so apportioned.

We do not have nor have we seen any adequate data concerned with gastroscopic studies made on suspected psychoneurotics. However, it seems safe to assume that any gastroscopic study of a series of patients whose symptoms were presumably of gastric origin would contain the average proportion of this so prevalent type of patient. Are we to believe that a very important percentage of these patients is suffering from gastritis? As an analogy consider that large group of patients with so-called mucous colitis or irritable colon. In the vast preponderance of instances the basis of their symptoms is a psychogenic one; it is probable that some of them have increased reddening of the mucous membranes of their colons, but this, as we see it, is a secondary manifestation. Is a "red stomach" the fundamental cause of abdominal symptoms in neurotics? No, to us it is yet a far cry to say that the changes which have been described as resulting from gastritis are surely the basis of the symptoms of the properly diagnosed neurotic.

We do not mean to infer that gastritic changes may not cause symptoms, certainly not. We have some patients whose symptoms seem to be caused by the abnormal state of their gastric mucosae. We have, however, no brief for the belief that the great majority of lesser changes recorded on gastroscopic examinations are demonstrations of disease.

Another side of the gastroscopic diagnosis of gastritis is concerned with the fact that, even though the gastritis were important and capable of giving symptoms, one might be given a false sense of security. In our present state of lack of exact knowledge as to the etiology, role and importance of these changes, how are we to know that they are more than casual findings? We may have missed the recognition of an early carcinoma, and how disconcerting to accept the diagnosis of gastritis and later have the true cause of the symptoms clearly manifest itself.

At this phase of the discussion it may be of interest to read a short note culled from a series of observations set down by William Beaumont[16] in his study of the case of Alexis St. Martin, who has been made immortal through a combination of events and circumstances over which he had no control, to wit: an accidental gunshot injury to his stomach and the consequent attention and often possessive interest of an unusually competent and persistent student. William Beaumont wrote:

"Diseased appearances, similar to those mentioned above" (and these are called by him pimples, erosions and aphthous spots) "have frequently presented themselves, in the course of my experiments and examinations, as the reader will have perceived. They have generally, but not always, succeeded to some appreciable cause. Improper indulgence in eating and drinking has been the most common precursor of these diseased conditions of the coats of the stomach. The free use of ardent spirits, wine, beer, or any intoxicating liquor, when continued for some days, has invariably produced these morbid changes. Eating voraciously, or to excess; swallowing food coarsely masticated, or too fast; the introduction of solid pieces of meat, suspended by cords, into the stomach; or of muslin bags of aliment, secured in the same way; almost invariably produce similar effects, if repeated a number of times in close succession.

"These morbid changes and conditions are, however, seldom indicated by ordinary symptoms, or particular sensations described or complained of, unless when in considerable excess, or when there have been corresponding symptoms of a general affection of the system. They could not, in fact, in most cases, have been anticipated from any external symptoms; and their existence was only ascertained by actual ocular demonstration.

"It is interesting to observe to what extent the stomach, perhaps the most important organ of the animal system, may become diseased, without manifesting any external symptoms of such disease, or any evident signs of functional aberration."

In this note, an example of the detail of the whole work, the author has written a description of the series of changes we are now observing by means of the gastroscope. We see in his writing a witness of the same inability we have today to accept these changes as certain cause for gastro-intestinal symptoms.

The investigations of Faber, Konjetzny, Simpson and others have shown us a great deal about the cellular pathology of gastritis. From gastroscopy we have learned or added to our knowledge of gastric mucous membrane changes (other than those of ulcers and neoplasms) as follows:

(1) We know that with considerable frequency we see pigment spots, mucous exudates, erosions, edema and bleeding. We know vir-

tually nothing concerning their significance or their etiology.

(2) We know that these changes may appear and disappear rapidly.

(3) We have been able to show that bleeding may come from the mucous membrane without chronic ulceration.

(4) We know that those changes seen in x-ray films which have been called the result of rugal patterns are not always seen on gastroscopic study; in fact, the two seldom correspond.

(5) We have evidence, as a result of Ruffin's investigations, that the changes that have been considered as diagnostic of one or another form of gastritis may, as a result of changing intragastric pressure by inflation, be made to assume the appearance of one or another of the so-called pathologic mucous membrane patterns.

Let it not be thought that we are unaware or unappreciative of the advantages that may accrue from present and future gastroscopic studies. We are fully cognizant of their implications. We do feel, however, that on insufficient or misunderstood evidence an enhanced idea of the frequency and importance of gastritis is being engendered. We believe that the frame of mind needed now is the skeptical one which will accumulate data culled from adequate clinical studies and that a halt should be made to the effort to explain unusual patterns, the etiology, significance, symptomatology and therapeusis of which are completely unknown to us. While these data are being accumulated and evaluated, the great diagnostic assistance obtained from gastroscopy will, in the main, be limited to the study of the coarser lesions such as ulcers, tumors, and the demonstration of bleeding areas.

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DISCUSSION (*Abstract*)

Dr. Julian M. Ruffin, Durham, N. C.—The clinician is constantly confronted with the problem of the patient who complains of upper abdominal distress, conforming to no recognized symptom complex, and in whom all studies, including x-rays, fail to establish the diagnosis.

Years ago such patients were usually classified as having "chronic gastritis"; however, as pathologists were unable to demonstrate evidence of an inflammatory process in the gastric mucosa, the diagnosis of chronic gastritis fell into disrepute and was largely abandoned. In its stead there has crept into the literature the term "functional gastro-intestinal disturbance," or "gastric neurosis," which is now used to cover this group of patients.

With the advent of gastroscopy it is not surprising that extensive studies should have been made to determine the relationship, if any, between the gastroscopic picture and the symptomatology of these patients, and one reads with astonishment that chronic gastritis occurs in anywhere from 35 to 50 per cent of all patients gastroscoped; and, as Dr. Howard has told you, in some reports as high as 70 per cent.

The diagnosis of gastritis in these cases is based upon the observation of mucus in excess of what is felt to be normal, of an increased redness of the gastric mucosa, and of large swollen, edematous folds, or the absence of folds.

The terms "superficial," "hypertrophic," and "atrophic gastritis" are now in current use. It has been stated also that certain of these types of gastritis have a characteristic symptomatology, and that gastritis is in itself a very serious disease.

I agree entirely with Dr. Howard that the diagnosis of chronic gastritis is made far too frequently; that minor and insignificant deviations from what is thought to be normal should not be cited as evidence of gastritis; and, what is more important, great caution should be exercised before assuming that the patient's symptoms are in any way related to the changes observed in the gastroscope.

I have already pointed out that the gastroscopic picture can be altered markedly by merely inflating the stomach. As you all know, some inflation is necessary for observation, but if one carries this process further, folds may be flattened or even completely obliterated, and in some instances the picture of atrophic gastritis

with blood vessels easily visible, can be produced. In the dog, apparently, this can be produced at will.

In a series of 700 patients gastroscoped at Duke Hospital, I have found very little evidence of what I could call chronic gastritis. On the contrary, atrophy of the gastric mucosa is a relatively common finding and in my experience is usually associated with a deficiency state.

It is my belief that the term "atrophic gastritis" should be discarded, as in all probability this represents a degenerative process rather than an inflammatory one, and, as I have just said, is usually associated with, if not actually due to, a deficiency disease.

I agree entirely with the authors in saying that the problem of chronic gastritis is far from solved and requires more carefully controlled studies in the future.

Dr. Cecil O. Patterson, Dallas, Tex.—During the last several years my partner, Dr. M. O. Rouse, and I have used the gastroscopic examination as a diagnostic aid. If a previou ly unknown or only suspected gastritis was recognized the problem was re-appraised. Thereby was initiated a plan of treatment which benefited a number of patients for several years. For example, the hypertrophic, acute and chronic superficial types of gastritis have seemed to respond best to general care plus the removal of chemical, mechanical, thermal and bacterial irritants to the stomach, while the train of events associated with atrophic gastric mucosal change has responded very well to general care plus the plan of Benedict and Jones, that is, the giving of liver extract. We, however, have felt the need for something more in the treatment of a few patients having extensive atrophic change but not having a disturbed blood picture to indicate the need for added intrinsic anti-anemic factor.

The classification of gastric mucosal disease is the outcome of study by many capable physicians for the last several decades. We look forward eagerly to further information, which no doubt will come from study of the microscopic anatomy of large series of normal and diseased stomachs. Until more of such data are available the subject of gastritis may in some respects remain a controversial one. However, even now, with such gastroscopic and anatomic information as has been presented by Ewing, Schindler, Palmer, Renshaw, and Templeton; Benedict, Jones, and Schatzski; Moersch, Eusterman, and Robertson; Schiff, Swalm, and Morrison, Freeman, Borland, Browne, and McHardy, and the essayists of today, Drs. Howard and Martin, and Dr. Ruffin, plus extensive studies presented by such Europeans as Faber, Konjetzny, Henning, Simpson, and Moutier; we have already gone a long way in removing some apparently definite disease entities from their former classification of "chronic nervous dyspepsia."

In the evaluation of symptoms our patients with atrophic gastric mucosal change have been more commonly those having long standing weakness, loss of weight, nervousness and burning or gaseous epigastric discomfort. The hypertrophic gastritic change seemed characterized by stormy pain of ulcer-like or greater severity, of vomiting, severe burning more often in a patient of habitual excesses and indiscreet as to the quality and quantity of what was put into his stomach. Hematemesis, often massive, occurred not infrequently in all forms of gastritis. Often symptoms have no correlation with the type of gastritis, but the same may be said of early cancer of the stomach. Moreover, just as an early diagnosis of cancer of the stomach gives the surgeon his only chance to effect a cure, so it is no less true that a correct diagnosis of non-malignant gastric mucosal disease often gives to the patient his only chance for a proper therapeutic program to prevent years of gastric discomfort and more or less invalidism.

In the differential diagnosis of nonspecific gastric mucosal disease or so-called gastritis, we encountered diaphragmatic hernia, benign ulcer, neoplasm, syphilis, tuberculosis, foreign bodies, allergic conditions, disorders of stomach motility, and so on. The rarity of syphilis of the stomach is suggested in that only six patients having proven extensive syphilitic disease of the stomach were seen. Four of these came from the venereal disease outpatient department of Parkland Hospital where 10,000 to 12,000 new patients having syphilis are admitted each year. The rarity of tuberculosis of the stomach is indicated in that only three patients were so diagnosed. One of these was thought to have a malignant lesion by the roentgenologist, the gastroscopist, and the surgeon and only after studies of multiple sections from the stomach and adjoining glands did the pathologist give to us the correct diagnosis. Finally, we have observed questionably malignant lesions of the stomach make astounding changes in only a few weeks time so that we now urge re-examination both by x-ray and gastroscopy after as short a time as two to four weeks on strict medical management. At this time we have usually been able to make what proved to be the correct diagnosis of the benign or malignant nature of the lesion.

Dr. R. John F. Renshaw, Cleveland, O.—One should not interpret every change of the mucosa as gastritis, but must remember that chronic gastritis is a very real disease producing at times very distressing and alarming symptoms.

The essayists state that various authors give the incidence of chronic gastritis as from 35 to 50 per cent. This needs further consideration because those figures include all patients examined. Many of the patients have peptic ulcer, carcinoma, gallbladder or other organic diseases, and the gastritis is an incidental concomitant finding. If one eliminates such cases from consideration and considers only those patients in whom gastric mucosal changes are the only positive finding, the percentage will be much less. In my experience uncomplicated gastritis constituted only 6 to 7 per cent of all patients examined.

Another factor to bear in mind is the variation of the normal mucosa. So far as I know, no one has examined by gastroscopy a large number of normal patients who have no gastro-intestinal complaints. It would be interesting if someone, with facilities such as Dr. Ruffin had and recently reported, could examine three or four hundred normal patients to determine the normal variations.

Lastly, I wish to emphasize that gastro-intestinal diseases are notorious for their remissions and exacerbations. In the case of duodenal ulcer, the roentgenologist may report a deformity but he does not make a diagnosis of duodenal ulcer. It is up to the clinician to correlate the findings, and to make the diagnosis. The same logic should apply to gastroscopy and gastritis. The gastroscopist may report mucosal changes,

but it is up to the clinician to correlate the findings and decide whether the change represents an active or quiescent process. I believe some of the changes we see are remnants of previous gastro-intestinal insults or injuries, and not necessarily the cause of the difficulties at the time of the examination.

Dr. Howard (closing).—Dr. Ruffin and I see eye to eye in this problem, and I am glad to know that Dr. Patterson has found the same symptoms in patients with gastroscopic evidence of chronic superficial gastritis which he found in patients with normal gastric mucosae.

I, like Dr. Renshaw, feel that the interpretation of what we see really rests with the clinician. At present I often venture no further in gastroscopic diagnosis than to write "red stomach." This red stomach may not represent primary disease; there may be something to cause it, such as gallbladder disease. Some one has said, that whenever one sees gastritis, he should look for ulcer or carcinoma. That is probably an overstatement, but it is something to think about. Let us be certain that there is nothing else which could cause the symptoms before we too readily accept gastritis as their cause.

GASTRIC POLYPOSIS*

CASE OBSERVED GASTROSCOPICALLY

By NORMAN GIERE, M.D.
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Multiple polyps of the stomach are relatively rare, as is shown by a review of autopsy statistics. In a review of 34,670 autopsies at the University of Minnesota only 32 cases were found. By multiple polyps I mean three or more. Stewart found 20 multiple cases in 11,000 autopsies at the Leeds General Infirmary. Carman[2] encountered only 2 cases in 50,000 roentgen examinations of the stomach.

The etiology of multiple polyps is still obscure. Weschselmann, Rippert and others believe them to be of congenital origin. There seems to be an hereditary factor in polyps of the large bowel, since the condition has been found in twins as well as in various members of certain families. Menetrier, Cornil and others maintain that chronic inflammation is the cause. It seems that in general the etiologic agents in benign tumors of the stomach are much the same as in other pathologic changes in the stomach, namely: alcoholism, dietetic errors, atheroma of blood vessels, and chronic gastritis.[3] Menetrier first classified multiple gastric polyposis into two types, *polyadenomes polypeux* and *polyadenomes en nappe,* characterized by well demarcated plaques of closely placed folds of hypertrophic mucous membrane. This classification is still used even though Menetrier recognized only an inflammatory origin in all gastric polyps.

Congenital growths on microscopic examination show an adenomatous pattern with a well-marked connective tissue stroma and little or no inflammatory reaction. The inflammatory polyps show a diffuse increase and enlargement of the gastric glands which show no departure from normal. Polyps are usually classed as benign. They may vary from a few millimeters to several centimeters in diameter and may be either sessile or pedunculated. Considerable confusion has arisen over the differentiation of genuine adenomatous polyps from the polyp-like growths seen in hypertrophic gastritis. Schindler[4] described the gastroscopic differentiation in 1923. He says:

> "Gastroscopically there is a definite difference between the rare polypoid hyperplasias of hypertrophic gastritis and the true tumors. The pseudo-polyps are large, sponge-like, bluish-red protrusions of a terribly swollen hypertrophic mucosa. The mucosa covering true polyps, on the other hand, looks normal, although frequently gastritic changes, atrophic, never hypertrophic in type, may be seen in the stomach."

Multiple polyposis has been observed gastroscopically by several European investigators[5-6] and recently by Schindler and Serby[7] in association with pernicious anemia.

Benign polyps often produce local functional disturbances or may give no symptoms. In the series of Brunn and Pearl abdominal distress was present in 28 per cent of cases; vomiting, anorexia, constipation, diarrhea and weakness each in about 17 per cent, and hematemesis in 8 per cent.

Secondary anemia is considered by other authors as a very frequent and important sign of benign polyps. The relation which exists between polyps of the stomach and carcinoma is a most important thing to determine.[8-9-10] Lawrence's[1] series shows 18 per cent of gastric polyps to be malignant. Other investigators show similar figures. In our series of 32 cases of multiple polyps four, or 12.5 per cent, were malignant. Brunn and Pearl also found 12 per cent malignancy. It is generally conceded that all polyps of the stomach are potentially malignant. They may insert themselves into the pylorus, thus causing obstruction, or resulting in a ball-valve action.[10] Perforation of the duodenum has even been noted.[11] Benign polyps seem to occur most frequently in the region of the pylorus and lesser curvature, as shown by Lawrence's figures and ours at the University of Minne-

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sota. They may occur at any age, but are more common in individuals over 40 years of age. As might be expected, an absence or reduced content of free hydrochloric acid is found. Secondary anemia, together with the achlorhydria which is said to be found in about 90 per cent of cases, may simulate a picture of pernicious anemia. It must also be kept in mind that they may be found in association with this disease. The following case report is of value because it presents several interesting features and because it affords a good gastroscopic study which is of value in the differential diagnosis. The relevant facts of the case are as follows:

On October 21, 1936, a 58-year-old male was seen, who complained of a dull, steady epigastric pain which seemed worse after eating. His appetite was not bad, but he said that he was afraid to eat. He had lost 15 pounds in weight since January. He had no vomiting, no changes in bowel habits, and no gross blood in the stool. Physical examination disclosed nothing of importance other than some generalized tenderness in the abdomen.

Laboratory examinations revealed the following: leukocytes 5,300, with a normal differential count, erythrocytes 4,700,000, and hemoglobin 86 per cent. Free hydrochloric acid was not present following an Ewald meal. Urinalysis was normal. Roentgenological examination of the gastro-intestinal tract October 24, 1938, revealed a polypoid growth in the cardia. The patient was then referred for gastroscopy with the following findings:

"The angulus appeared irregular as a result of edema, but the pylorus was seen in its entirety. Several polypoid lesions were seen in the antrum extending almost to the pylorus. They appeared to be projections of the mucous membrane. On the posterior wall of the antrum was seen a large mucosal erosion. The mucosa of the body of the stomach was greyish and edematous. At the cardia was seen one large polyp, the mucous membrane of which seemed to be continuous with that surrounding. No bleeding was seen and nothing to suggest a malignant invasion was noted."

Gastroscopic examination was repeated October 29, 1938, at which time the findings were the same except for apparent healing of the erosion previously noted. Because of the appearance of the polyps and the atro-

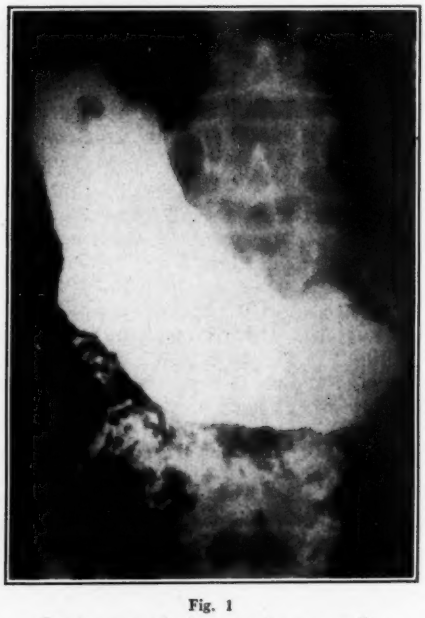

Fig. 1
Roentgenogram showing one polyp near cardia.

Fig. 2
Gastroscopic view of antrum showing a portion of pyloric orifice and three polyps not demonstrated by x-ray. Note also erosion and swollen, greyish mucous membrane.

Fig. 3
Gastroscopic view of polyp near cardia.

phic type of mucosa surrounding, this was concluded to be a true case of polyposis ventriculi. The patient was placed on a high caloric, low residue diet with supplementary feedings and general reconstructive therapy, and there was an almost immediate improvement in his condition. In three months his weight had increased from 122½ to 143 pounds. He was again gastroscoped March 11, 1939, and the polypoid condition had undergone no change, although the mucosa appeared to be less edematous. The patient was last seen on July 22, 1939, at which time he stated that he had no complaints. His hemoglobin was 98 per cent, red cells 4,800,000, and weight 132.

DISCUSSION

In this case gastroscopy confirmed the roentgenologic impression of a polypoid condition of the stomach. It gave much more exact information, however, in that it disclosed the presence of polyps not seen by x-ray as well as erosions and evidence of atrophic gastritis which made the differential diagnosis between true polyposis of the stomach and nodular hypertrophic gastritis certain. This differential diagnosis is very important. Because of the extensive involvement and the apparent benignancy of the lesions in this case, we did not attempt to break down his prejudice against operation. However, most cases of gastric polyposis lend themselves readily to surgery and because of their potential malignancy they should have surgical attention. Hypertrophic gastritis, on the other hand, should never be operated upon unless severe hemorrhage or another unusual complication makes it necessary. The rather unusual response to nonspecific therapy which he showed could possibly be accounted for by the fact that his atrophic gastritis responded symptomatically to dietary management.

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NEONATAL PNEUMOTHORAX*

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Neonatal pneumothorax as an entity is regarded by some to be quite rare. This belief is no doubt due to the paucity of reported cases in the literature.

We concluded that the entity is probably not so rare, but that it is probably being overlooked. Very few newborns are given x-ray studies; the physical findings might be interpreted as the commonly diagnosed "congenital atelectasis;" and few autopsies are conducted under water.

In collecting the reported cases it was observed that no articles on this subject had appeared in the obstetrical literature. Since then, an excellent and comprehensive article by DeCosta[1] has appeared. DeCosta has reviewed some 67 cases of pneumothorax appearing in the first few months of life. In the addenda and discussion 6 other cases are reported, making a total of 73.

The present communication presents 3 cases and reviews those cases not included in the summary of DeCosta.[1]

Our interest lies chiefly in those cases developing pneumothorax within the first 48 hours. Our cases fall within this category. DeCosta[1] records that 46 of his collected cases developed pneumothorax in the first 10 days of extra-uterine life. The physical problems arising the first 2 days are more directly related to (1) birth trauma, (2) artificial respiration, and (3) independent life processes. It is also at this period in life that our greatest infant mortality figures are shown. Potter,[2] in her recent survey of 2,000 fetal autopsies, of which 795 cases were born alive, reports that 70 per cent died in the first 48 hours.

ETIOLOGY OF NEONATAL PNEUMOTHORAX

(1) Congenital defects

(2) Infection

(3) Trauma
- (a) Artificial respiration
- (b) Direct mechanical injury
- (c) Tension or obstructive type

(4) Unknown

Group 1 included giant cysts, aplasias of the lung, and broncho-pleural fistulas. One of

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SUMMARY OF CASES OF NEONATAL PNEUMOTHORAX

Case	Author	Weight	Delivery and Condition of Baby	Age		Sex	Side and Type	Treatment	Termination	Possible Etiologic Factors and Remarks
				Onset of Symptoms	When Diagnosed					
1	Leopold and Castrovinci[20]	5 lbs.	Spontaneous; asphyxia	Few hours	Few hours	M	Left 50%	O_2	Living	Possible puncture in attempts to give intracardiac medication
2	Donahoe[27]	8 lbs.	Difficult podalic version and breech extraction	2 days	2 days	F	Right	None	Living	Stress of delivery
3	Donahoe[27]	?	Normal spontaneous at 8 mos.	5 days	5 days	M	Right 50%	None	Died	Cause unknown. An associated sclerma neonatorum and probable cerebral hemorrhage
4	Elkin	2750 gms.	Breech extraction; asphyxia	Birth	Post-mortem	M	Left 75%	O_2 and CO_2	Died	Birth trauma. Tracheal catheter and mouth-to-mouth breathing. Artificial respiration. Intracardiac puncture
5	Elkin	4120 gms.	Breech extraction; asphyxia	Birth	Post-mortem	M	Right 60%	O_2 and CO_2	Died	Same as above
6	Elkin	3690 gms.	Low forceps; asphyxia	Birth	Post-mortem	F	Bilateral 50%	O_2 and CO_2	Died	Same as above

Table 1

Stein's[3] cases proved to be a congenital giant cyst. Weiner's[5] case was a broncho-pleural fistula. Scheltema,[4] Miller, R. T.,[14] Miller, J. F.,[9] Meyer,[16] Hotz,[15] and Bertin[12] have presented cases based on congenital defects.

Group 2 represents tissue destruction, the result of infection. The pneumothorax has its onset later in life and does not directly concern this article. Glaser and Landon,[6] Wilkinson,[7] Gasul and Singer,[8] Miller,[9] Geyman and Clark,[10] Holz,[11] Bertin[12] and Hazek[13] have reported this type of case.

Group 3 includes extrinsic obstructions to the respiratory passages, such as an enlarged thymus as reported by Lim,[17] Hotz[15] and Bertin;[12] enlarged thyroid reported by Reidwig,[18] and cases with the cord tightly around the neck as reported by Lim,[17] Willi[19] and Reidwig.[18] One would presume the possibility of an actual perforation by a fractured rib or clavicle, but this has not been reported. Group 3 also includes those cases traumatized by the mechanics of birth. In this group it is impossible to separate those cases that show a pneumothorax due to the trauma accompanying artificial respiration. In cases of this type one must presume an actual alveolar or bronchial tear. Fractures and lacerations of the thoracic cage are not prerequisite to pneumothorax. It is a common experience to see cases of pneumothorax in older children as the result of accidental injury in which no fractures or lacerations are present. Alveolar tension becomes excessive with resultant rupture. This excess tension may result not only from physical trauma of birth, but the physical trauma of artificial respiration. It might also result from partial occlusion of an air passage and resultant ball-valve action. This occlusion may be caused by meconium, vernix caseosa, mucus, or edema of larynx with collapse of the epiglottis. Under these circumstances an intense expiratory effort or cough might rup-

ture a normal alveolus. One that was congenitally weak would be even more predisposed to rupture.

Rupture of an alveolus has been shown on the autopsy table in only a few instances. As DeCosta[1] points out, a slow leak or a rupture that seals itself quickly is most likely in view of the fact that a single aspiration of air often results in cure. He has also shown that pressures as low as 18 or 20 mm. of mercury were sufficient to cause a bullous mediastinal emphysema in some dogs with no gross evidence of lung damage. In this regard the case reported by Strongin[20] showed a neonatal pneumothorax with air in the mediastinum and subcutaneous tissues.

The diagnosis of pneumothorax depends primarily upon the radiograph with the exception of those cases due to infection. As Pehu[21] says:

"The symptomatology is rather poor: dyspnea and cyanosis, two very banal symptoms upon arrival in the new world."

Limited excursion of the hemithorax involved with abdominal breathing, absence of breath sounds on the involved side, hyperresonance and shifting of the heart away from the pneumothorax might be elicited.

The radiograph should be used in all cases of dyspnea, especially when artificial respiration has been attempted or when delivery has been difficult. In the tension type of case, the diagnosis and aspiration of the air may mean the difference between an intact and severed thread of life at this age. Physical diagnosis is even more difficult when the difficult delivery has resulted in meningeal or brain hemorrhage as is often the case with resultant convulsions, cyanosis, and dyspnea.

The following reports and many others reveal the necessity of the radiograph in these difficult births. Ruge[28] reported a hard breech extraction with onset of symptoms in 14 hours with a demonstrable 3 cm. tear in the pleura. Flipse[22] reported pneumothorax after a forceps delivery and tracheal catheterization. Emmert[23] reported the pneumothorax developing after mouth-to-mouth breathing in a fetus delivered by cesarean section. Deissler[24] reported 3 difficult deliveries, one with forceps, and each received artificial respiration and showed a pneumothorax. Strongin[20] reports a difficult midplane forceps case that showed Erb's palsy, subcutaneous and mediastinal emphysema, in addition to the pneumothorax. DeCosta[1] reports a spontaneous delivery in which a tracheal catheter was used and pneumothorax resulted.

Treatment would consist of avoidance of birth trauma and avoidance of excessive pressure when valuable mouth-to-mouth breathing and tracheal catheterization is used. Torpin[25] has recently perfected a very inexpensive tracheal insufflator, part of which is a small air trap with a metal lid that allows air to escape when the pressure applied exceeds 10 inches H_2O and falls back into place when the pressure is less than 10 inches H_2O. This method avoids expensive pressure gauges and valves.

Aspiration of air is indicated only when tension is obvious.

The chief features of the cases reported to date have been summarized recently by DeCosta.[1] A summary of those cases not included in his report and 3 additional cases are presented, all of which are of the immediate or abrupt type.

In the following cases we observe many points of similarity:

Case 1 (*Fig. 1*).—An 18-year-old negress was gravida 2, para 1. She had been seen in the antepartum clinic 8 times and had a normal prenatal course. She was admitted with the diagnosis of pregnancy with labor and pyelitis of pregnancy (the latter acquired apparently 5 days previously).

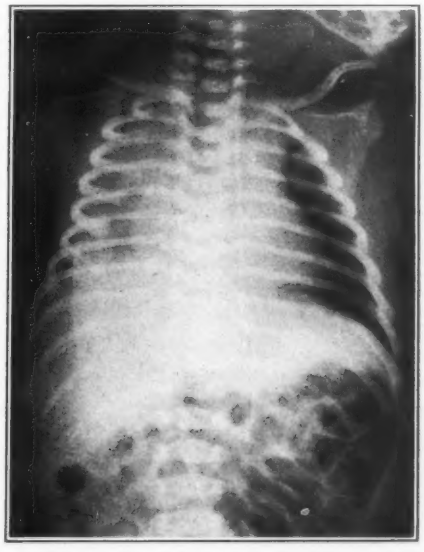

Fig. 1

Left pneumothorax. No subcutaneous emphysema. Breech extraction. Artificial respiration and tracheal catheter used.

Previous delivery was normal. Baby weighed 6½ pounds and was stillborn.

Present delivery was complicated by left sacro-anterior position and precipitation up to thighs. A deep left midlateral episiotomy was followed by a breech extraction. The posterior shoulder delivered first and the left (anterior) shoulder delivery was made after the left forearm nuchal position was corrected. The head was delivered by Mauriceau's maneuver. First stage of labor was 17 hours, second stage 1 hour, 5 minutes, and third stage 7 minutes. The baby did not cry, but the heart was beating. Heat, "coramine" and tracheal catheter were used over the next hour and 15 minutes. Injection was made into the heart. There were several convulsive inspirations, but breathing was never established. The fetus weighed 2,750 grams.

Autopsy revealed a laceration of the tentorium leaflet separating the cerebellum and the left occipital lobe. "This has caused considerable hemorrhage and is undoubtedly the cause of the baby's death." (Autopsy was not done under water. Rent in lung was not found.)

A roentgenogram was made preceding the autopsy (*Fig. 1*). Note that the collapse is on the left. There is partial expansion of the right lung field. There is practically no shifting of the mediastinum. There is no subcutaneous emphysema. The fetus appears otherwise normal.

Case 2 (*Fig. 2*).—A 28-year-old negress was gravida 5, para 4. Preceding deliveries had been uneventful. She had visited the antepartum clinic 8 times and had run a normal prenatal course with her present pregnancy.

She was delivered of a large infant weighing 4,120 grams by breech extraction. The position was right sacro-anterior. The after-coming head was difficult to deliver, as the head was caught on the cervix and required 6 minutes to deliver by pressure from above. There were no lacerations. The heart tones were good. The length of the first stage of labor was 18 hours and 50 minutes, second stage 33 minutes, and third stage 6 minutes.

The baby failed to breath after delivery, but had made 3 attempts before the after-coming head was delivered. "Coramine," lobeline, epinephrine, artificial respiration, heat, tracheal catheterization and mouth-to-mouth breathing were given over a period of 1 hour. "Coramine" 1 c. c. was injected directly into the heart. The baby finally began an irregular respiration and was put in incubator under an oxygen tent. He appeared cyanotic with a ring of pallor around the mouth. The baby died about 4½ hours after delivery, having respiration and physical signs of intracranial hemorrhage.

Autopsy revealed a massive intracranial hemorrhage and cause of death was listed as "respiratory due to massive cranial hemorrhage." (Autopsy was not done under water. Rent in lung was not found.)

Case 3 (*Fig. 3*).—A 20-year-old colored female, primipara, was first seen in the emergency room on April 3, 1941. The history was that she was at term, had been in labor the past 16 hours, that she had a number of vaginal examinations (unsterile) by her local doctor, and that she was advised to come to the hospital as the baby would "have to be taken."

She stated that she had been nauseated the past 3 months and had vomited every 3 or 4 days during this interval. She had marked edema of the feet and ankles

Fig. 2
Right pneumothorax. Breech extraction. Artificial respiration and tracheal catheter used.

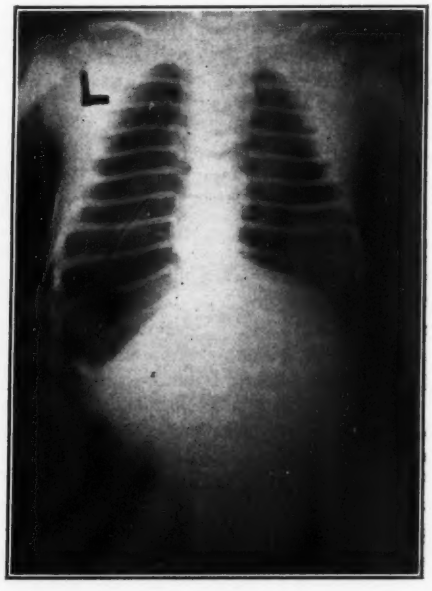

Fig. 3
Note bilateral pneumothorax, compression of the heart, subpleural, retroperitoneal and subcutaneous air on the left.

the past 3 weeks, and had had a moderately severe convulsion en route to the hospital.

Examination revealed the blood pressure to be 230/130, temperature 100°, pulse 110 and respiration 24. Marked edema extended above the knees. The abdomen and face were edematous. The cardiac dullness was slightly increased to the left, and the lungs were clear and resonant. The fetus was in right occipital posterior position. The cervix was 90 per cent effaced and showed 7 cm. dilatation. The membranes were ruptured.

Urine analysis showed 4 plus albumen; blood uric acid was 5.8 mgs. per cent.

X-ray examination of the pelvic inlet revealed the total AP diameter to be 12.8 cm. and the total transverse diameter to be 11.2 cm. The posterior segment of the pelvic inlet was of the anthropoid type. The anterior segment was well rounded as in the gynecoid type.

Patient was given treatment for eclampsia. Head was rotated to the left occipital anterior position. Patient had another convulsion at 2:30 p. m. and again at 5:30 p. m. the afternoon of admission. At 7:00 p. m. episiotomy was done and low Simpson forceps were applied. A 3,690 gram female infant was delivered. Total duration of labor was 25 hours, 40 minutes. The mother developed a putrid endometritis and pyelitis, was discharged on the fifteenth day, postpartum with no complaints, normal temperature, and blood pressure of 120/80.

The record of the child at birth was as follows: heart beat was present; respirations were delayed; did not cry; aspiration and artificial respiration were administered; the trachea was catheterized; and "coramine" was injected. The impression at that time was possible intracranial hemorrhage. The child lived twenty-two minutes.

X-ray examination of the dead fetus revealed a complete oblique fracture of the right clavicle and bilateral pneumothorax resulting in approximately 70 per cent collapse of both lungs.

There was an irregular accumulation of air evident in the left abdomen, apparently encapsulated. There was also an accumulation of air in the left abdominal wall, apparently between or under the muscular layer.

Autopsy revealed a subtentorial hemorrhage, congestion of brain, fracture of right clavicle, bilateral pneumothorax, complete atelectasis of both lungs, subpleural emphysematous blebs, postperitoneal emphysema, multiple contusions of forehead and scalp, and cephalohematoma.

There were innumerable pinpoint to .6 cm.-sized subpleural emphysematous blebs on all surfaces. Those situated on the anterior and lateral aspects of the lungs were smaller and more numerous than those on the medial aspect. No ruptured blebs were seen. The lungs were dark pink and relatively free from blood and sections floated in water.

The peritoneum over the left paracolic gutter and part of that forming the mesocolon was somewhat "ballooned-out" and was stripped from its posterior attachment by air or gas. The greatest "bulge" was on the lateral side of the roof of the left mesocolon and extended inferiorly to about the brim of the pelvis and superiorly it reached the reflection of the peritoneum upon the lower portion of the spleen. Approximately 10 c. c. of air were thought to be encapsulated.

SUMMARY

(1) A supplemental review of the subject of pneumothorax of the newborn is presented with the report of 3 additional cases, bringing the total reported up to 78.

(2) Of these reported, 51 are early and directly associated with birth and the establishment of independent life.

(3) Trauma appears to be the most common cause of abrupt neonatal pneumothorax.

(4) Those injuries caused by mouth-to-mouth resuscitation might easily be prevented by the use of the inexpensive tracheal catheter which prevents pressure exceeding 20 mm. of mercury.

(5) Neonatal pneumothorax should be considered as a possible complication, and radiographic examination of all cases showing cyanosis and dyspnea should be made.

(6) Radiographic examination of those cases in which delivery was difficult and in which artificial respiration was used will no doubt show an increasing incidence of neonatal pneumothorax.

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MULTIPLE, HEREDITARY, HEMORRHAGIC TELANGIECTASIA*

CASE REPORT WITH PATHOLOGIC STUDY

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Multiple, hereditary, hemorrhagic telangiectasia is a familial, vascular anomaly characterized by small tufts of dilated capillaries which are scattered, superficially, over the mucous membranes and skin, and which frequently cause troublesome or obscure bleeding. Grossly, these telangiectases are similar to the smaller ordinary nevi, but their more or less characteristic distribution, their frequent existence in several members of the same family, and the remarkable ease with which they may be traumatized and may bleed have led to their inclusion in a definite clinical entity. The purpose of this report is: (1) to record another case together with a tissue study, (2) to outline briefly the historic development of the recognition of this entity, and (3) to make certain comments upon this case in particular and the syndrome in general.

CASE REPORT†

A 46-year-old white housewife was admitted to the hospital with epistaxis of 12 hours' duration, weakness, and tachycardia. This admittance was the eighth in a series during the preceding four years, and all had been occasioned by severe epistaxis. Prior to four years she had considered herself well, although she acknowledged slight to moderate epistaxis increasing in severity since the age of 36; there had been none in childhood or adolescence. At the age of 36 her blood pressure was found somewhat elevated and subsequent admittances in this institution confirmed it, but the readings were by no means uniform. The epistaxis had not been seasonal, and she was unable to name any factor, with the possible exception of trivial trauma, which had seemed to provoke it. There had been no hematuria, melena or other abnormal hemorrhage, and on the occasions of minor cuts there had been no prolonged bleeding. She had experienced no purpuric or allergic manifestations. When questioned regarding some small, red spots on her fingers, she recalled having noticed them only during the past five or six years.

Her father had experienced periodic epistaxis as far back as she could remember him and had bled now and then from small red areas on his fingers similar in appearance and location to those which she exhibited. As she recalled, his hemorrhages had increased in frequency and severity with advancing years. He had died at 79 years of heart disease. No other relative had suffered epistaxis or abnormal hemorrhage in any form.

Physical examination disclosed an obese, pale, middle-aged woman lying quietly in bed. She was rational, intelligent, and cooperative. The skin was dry, and no eruption or discoloration was seen. In the center of the lower border of the right anterior naris was a dark-red, slightly elevated area 2 mm. in diameter (*Fig. 1*). On occasions this had bled, but not unduly. Other such smaller areas were found on the right side of the upper lip, the right cheek, the tongue, and the fingers of both hands; only one of the finger areas had bled (*Fig. 2*). On the tongue 10 telangiectatic areas were found on the right half, and 5 on the left half, the majority on both sides being in the distal third. The tongue was clean; it protruded in the midline without tremor, and its papillae were normal in appearance. On the hands a majority of the telangiectases were on the ventrum. A speculum examination of the nasal cavities showed 2 other telangiectases on the right side of the septum and none on the left. One of these was the site of bleeding in the current attack. It measured 1 to 1.5 cm. in diameter, was exceedingly friable, and bled afresh with each slight trauma. There was an area of approximately 1.5 cm. in diameter about it which was edematous and was scattered with either small tenacious clots or other smaller telangiectases. A careful search of the skin of the entire body did not reveal any other telangiectases. The pupils were round, equal, and reacted well to light and accommodation

Fig. 1
(Unretouched) Note the larger telangiectases on upper lip to right of philtrum and in center of right external naris. Other smaller ones are on right cheek and near tip of tongue.

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Fig. 2

(Unretouched) Note telangiectases on dorsum of right fingers and ventrum of left. The telangiectasis on the dorsum of right middle finger at distal phalangeal joint was the one which had bled and was, therefore, removed for microscopic study (See *Fig. 3*).

and extra ocular muscle function was intact. Ophthalmoscopic examination revealed no abnormalities The ears and throat presented no evidence of disease. There were no distended neck veins, thyroid enlargement, adenopathy or stiffness. The thorax was symmetric and expansion was good and equal on the two sides. The breasts were large and pendulous; no masses were felt. The lungs were resonant; the breath and voice sounds were unimpaired, and there were no rales. The heart rate was 96 per minute and regular, but of diminished volume. The P.M.I. was about 11 cm. left of the midline at the fifth interspace; a faint mitral systolic murmur was heard at the apex; blood pressure was 142/78 on the right. The abdomen was thick-walled but relaxed, and no tenderness, spasm, mass or fluid were detected; the liver edge reached the right costal margin at the end of inspiration; the spleen and kidneys were not palpable. The spine presented no evidence of disease, and the extremities were not remarkable except for the telangiectatic areas on the hands The knee and ankle jerks were equal and normal; no pathologic reflex was elicited. Pelvic examination revealed a transversely lacerated cervix and a second degree retroversion of the uterus, but nothing else; a speculum examination showed no vaginal telangiectases. Rectal examination was not remarkable.

The laboratory reported red blood cells 920,000; hemoglobin, 12 per cent (Sahli); white cells, 8,550; polynuclear neutrophils, 76; lymphocytes, 18; monuclears, 2; eosinophils, 3; basophils, 1. Blood platelets (by an indirect method) were 143,500. Clotting time (capillary pipette method) was 3 minutes. Urinalysis showed a slight trace of albumin with a specific gravity of 1.018, no sugar, and no unusual microscopic findings. The Kahn test was negative. The Rumpel-Leede test on several different occasions was negative.

One of the telangiectatic areas on the right middle finger was removed by a simple, eliptic incision after local procaine anesthesia. This area had bled from time to time and not always as a result of trauma which could be remembered. Though reddish-purple in color before the incision, it faded immediately to the appearance of the adjacent skin, indicating that the color of this area was due to circulating blood and not to clots or stagnant blood. Further, when examined in daylight with a hand lens, there was no detectable difference between the color of the exsanguinated telangiectasis and that of the small base of surrounding skin. This suggested the absence of pigmentation in the tissue. A hematoxylin-eosin section was reported as follows (*Fig. 3*): "There are numerous dilated capillaries lying almost immediately beneath the basal layer of the dermis. Here and there they appear to be bulging toward the surface and carrying ahead of them a thinned layer of connective tissue, outside of which is the somewhat stretched dermis and epidermis. In one place, particularly, the dermis is considerably thinned. Elsewhere than in the telangiectatic area, capillaries are only occasionally seen in the subdermal stroma, and none are seen very close to it. (W. E. S.)" These findings were then compared with those of a simple, red nevus which had never bled and which was removed from another person suffering with an entirely different ailment (*Fig. 4*): "The epidermis of this section has been lost in preparing the tissue, but the thickness and appearance of the dermis about equals that of normal skin. Beneath the dermis may be seen an ample layer of connective tissue embedded in which are large capillary sinuses filled with erythrocytes. (W. E. S.)" Except for thinness of the subcutaneous band between the capillary wall and the overlying dermis and a somewhat greater tendency to bulge toward the surface in the telangiectatic section, no special histologic differ-

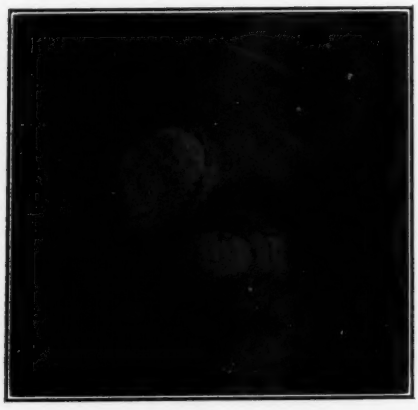

Fig. 3
Note the bulging capillary sinus with the thinned connective tissue covering just outside the endothelium. Except for these two features the appearance is not strikingly different from Fig. 4.

Fig. 4
Here the capillary sinuses are large and filled with erythrocytes, but they do not bulge and externally they are covered by a relatively stronger looking band of subcutaneous connective tissue.

ences were seen between it and the ordinary red nevus which had never bled.

Treatment consisted of transfusions and iron-ammonium citrate. At this admittance, these were supplemented with the subcutaneous administration of a commercial preparation of moccasin snake venom (*Ancistrodon piscivorus*) twice weekly, beginning with 0.5 c. c. and increasing 0.1 c. c. at each dose until a maximum of 1.0 c. c. was reached and then maintained with 1.0 c. c. weekly. The patient was discharged after 7 weeks of hospitalization and continued the weekly maintenance dose of venom during the following 2 months. At the end of this time, through negligence on her part, treatment was left off. Three months after the last weekly dose of venom she suffered a brief, mild epistaxis lasting an hour, and 11 months later she experienced another attack lasting one hour. Aside from these two episodes there had been no other significant bleeding at the end of the 25 months from the first administration of venom. This was the least amount of hemorrhage which she had experienced during a comparable length of time since onset of severe epistaxis four years previously.

HISTORIC

In 1896 Rendu[1] reported the case of a 52-year-old white male with profound anemia and a history of severe epistaxis daily for three weeks. His father had suffered with repeated melena and his mother and brother with frequent epistaxis. The patient had had periodic epistaxis since the age of 12 and more often in the spring. The skin of the nose, cheeks and upper lip, as well as the mucous membrane of the lips, cheeks, tongue and soft palate, presented many small telangiectases. Oddly, none were found on the nasal mucosa. In 1901, Osler[2] reported 3 cases and pointed out that, while so-called hereditary epistaxis, as well as epistaxis associated with telangiectases of the nasal mucosa, had long been known, the additional association of telangiectases upon other mucous membranes and the skin had been first described, so far as he could ascertain, by Rendu. Since these first descriptions numerous reports have appeared, and the diagnostic criteria which have come to be accepted for this syndrome are: (a) heredity, (b) multiplicity and a more or less characteristic distribution, and (c) tendency to bleed from the areas usually with surprisingly little trauma and sometimes, apparently, spontaneously. When these requirements are fully satisfied, it will be found that many suspected cases belong under other headings. The review of Hurst and Plummer[3] in 1932 appeals to us as being based upon a suitable number of correctly diagnosed cases.

COMMENT

A large majority of reported cases in the literature concern the anomaly as an uncom-

monly appreciated cause for epistaxis, skin bleeding or anemia. Some of the reports, however, concern physical signs thought to be caused by bleeding of telangiectases in certain viscera, and it is this possibility which the internist and neurologist might bear in mind with patients presenting telangiectases on the face, mucous membranes or hands, especially if there has been bleeding from these and a history of a similar status in some one of a different generation of the same family. However, as pointed out by Larrabee and Littman,[4] the evidence for existence of telangiectases in the viscera is largely presumptive in most of the cases recorded thus far and the coexistence of a few telangiectases on the body surface of a patient with visceral, pathologic signs (presumably resulting from hemorrhage of others internally) constitutes no proof of connection between the two.

The treatment of multiple, hereditary, hemorrhagic telangiectasia has been, until recent years, largely directed toward local obliteration of troublesome areas, and, indeed, the appropriate emergency measures are yet, of necessity, local ones, but it is now well realized that, with few exceptions, such efforts are rewarded with only the most temporary benefit. Among these measures may be mentioned local application of escharotics, diathermic coagulation and galvanocautery. Radium has generally been used with poor success and, in certain regions, with a highly undesirable cartilage necrosis, as pointed out by Houser[5] and others.

Local measures aside, it does not appear that anything very promising has yet been offered with the exception of subcutaneously injected moccasin snake venom (*Ancistrodon piscivorus*). This measure originated, apparently, with Peck[6] as a result of experiments related to other matters[7] in which he found that a refractory state to the Schwartzman[8] phenomenon could frequently be induced in animals if a vascular poison such as moccasin venom was previously injected and a sufficient period of time allowed to elapse. Instead of the expected local hemorrhagic necrosis of Schwartzman occurring at the site of previous intradermal injection of a bacterial filtrate, nothing happened when a subsequent intravenous injection of the same filtrate was made. Peck interpreted this as being due probably to some change in the capillary wall (increased endothelial integrity?) or to some effect upon the clotting factors of the blood. Subsequently he tested the effect, first of intradermal and later of subcutaneous injections of moccasin venom in a variety of hemorrhagic states which included 3 cases of multiple, hereditary, hemorrhagic telangiectasia. In the latter, the results were surprisingly good if maintenance doses were injected at weekly or biweekly intervals after the initial course had been given. In our case the patient had more freedom from hemorrhage during the period of venom treatment than at any time during the preceding four years.

SUMMARY

(1) A case of multiple, hereditary, hemorrhagic telangiectasia is reported. The diagnosis is believed to be correct because the cardinal requirements of hereditary, multiplicity and hemorrhage are satisfied.

(2) Hematoxylin-eosin sections of a typical telangiectasis indicate that there is no large difference in visible histologic structure from that of a simple nevus. It is suggested that bleeding, especially when spontaneous, may be more dependent upon other factors than visible histologic structure.

(3) With rare exceptions, local measures do not appear to yield anything but the most temporary benefit.

(4) The subcutaneous injection of moccasin venom (*Ancistrodon piscivorus*) seems to us to offer a promising therapeutic plan.

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ACUTE ATROPHY OF THE LIVER ASSOCIATED WITH PREGNANCY*

REPORT OF TWO CASES, ONE TERMINATING BY RECOVERY

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There have been comparatively few cases of icterus gravis reported since the advent of the present chemical analytical studies.[1] [2] Such cases generally have terminated fatally and have been presented from the clinical, laboratory and pathologic standpoints. It was thought, therefore, that the following two cases, one of which recovered, were worthy of presentation, both from the standpoint of treatment and because of the chemical analytical studies made throughout their clinical course. Both of these cases were treated in Vanderbilt University Hospital during the past four years. The common drugs which often cause liver atrophy independently of pregnancy we believe can be excluded as causative agents.[1]

Case 1.—Mrs. D. T., aged 25, white, female, gravida 5, para 3, was admitted to the hospital approximately 9 months pregnant. Her immediate illness began six days previously with nausea, weakness, vomiting and epigastric pain. Nausea and vomiting persisted and two days later her skin became yellow and her urine was described as "dark coffee-ground colored." The stools were clay-colored and foamy. When seen at this time there was tenderness over the gallbladder, but no change in the liver dullness. Her jaundice increased during the next two days, but the nausea and vomiting abated somewhat by the time of her admission to the hospital.

The patient's past history included four previous pregnancies, three terminating normally and one terminating in miscarriage seven years previously. She had been treated at a local dispensary for syphilis, having had a positive Wassermann 18 months before admission; she had received three injections of arsphenamine and three injections of bismuth, beginning five months and ending four months before admission. Her record at Vanderbilt dispensary showed a positive Kahn and a negative Wassermann in 1929 and a negative Wassermann in 1931. Late in this pregnancy she was found to have a 3+ Kahn and a negative Wassermann; treatment was not instituted, however, due to the late stage of her pregnancy. Pregnancy has been essentially normal except for headaches and mild edema at the seventh month, responding to added rest and magnesium sulphate.

On admission the patient was acutely ill, markedly jaundiced, tender over the right costal margin, with the abdomen distended by a term pregnancy (McDonald, 34 cm.). The blood pressure was 120/88, there was no edema and the patient was oriented. Blood examination at this time revealed hemoglobin 13.6 gm., red blood cells 4,200,000, white cells 13,600 (predominantly leukocytes), an elevated icteric index, biphasic van den Bergh, clotting time 5.5 minutes (tube method), and low serum protein (*Chart 1*). Urine was strongly positive for bile and there was a 1+ albuminuria.

She was given 1,000 c. c. of 10 per cent glucose intravenously, went into labor in six hours and delivered spontaneously 1 hour and 50 minutes later without anesthetic. Following delivery she had a small hemorrhage and subsequently received more glucose and a transfusion of 500 c. c. of blood. The following day she became comatose, edematous and at times was quite restless and cried out frequently.

Leucine and tyrosine crystals could not be demonstrated in the urine at this time. Treatment consisted of constant attention, hypertonic glucose intravenously, calcium gluconate and transfusions. In spite of this, the following three days were characterized by no decrease in her jaundice or edema; she remained continuously comatose, grew considerably weaker, and died on the fifth postpartum day. She had no temperature elevation over 100.6° until terminal rise of 108° with corresponding changes in respiration and pulse.

A summary of the progression of chemical changes occurring in the blood are seen in *Chart 1*. The most significant changes are observed in the blood guanidine, nonprotein nitrogen and icteric index. X-rays taken shortly before death showed a liver shadow thought to be in normal limits.

Postmortem examination[2] revealed, in addition to the liver findings, generalized jaundice, a normally involuted uterus, gross hemorrhage of the endocardium and moderate fibrinous exudate of the epicardium. There were small areas of hemorrhage along the intestinal tract with considerable congestion. The spleen was enlarged with dense fibrinous adhesions over the surface and the pulp showed congestion and hemorrhage. The kidney presented swollen glomeruli, with increased cellular elements, hyalinization of the tuft capillaries, granular degeneration of the cells of the convoluted tubules and interstitial edema. The bladder was edematous and hemorrhagic. The findings in the liver were more striking and are as follows: weight, 1,150 gm., 3 mg. arsenic per 100 gm., and a marked decrease in the size of the left lobe. There was a diffuse mottling of the surface with many purplish areas, both large and small, which were depressed below the liver surface and without lobular outline. These were spongy in structure as if composed of collapsed stroma. On cut surface the liver showed a deep yellow color, opaque appearance and a finely nodular surface from the swelling of the individual lobules.

The lobular boundaries were discernible in areas and a depressed red color could usually be seen in the center. Microscopically the liver showed marked and advanced destruction of liver cells in a most irregular pattern throughout the structure. The necrosis seemed to involve entire areas of liver rather than around the central vein of the lobule. Necrosis was seen to involve a large irregular area in which the portal triads, central veins, bile ducts and irregular areas of liver cells persisted. Most of the liver cells showed evidence of absolute damage. The cells were swollen, coarsely granular, and showed extreme fatty vacuolization with irregular

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CHEMICAL CHANGES IN BLOOD

	4/10/35	4/13/35	4/15/35	5/16/35
Hemoglobin	13.6 gm.	16.6 gm.		
Clotting time	5.5 min.	4.5 min.		
Bleeding time	2.5 min.	4.5 min.		
N. P. N.	31	55		75
Icteric index	45	60	63	
van den Bergh	Biphasic	Biphasic		
Serum protein	3.74	5.82		
Albumin	2.79	3.59		
Globulin	0.95	2.23		
Uric acid	3.8	3.6		
Guanidine		0.80	0.91	
Urea nitrogen		14		
Carbon dioxide		60.7		
Sugar	400			

Chart 1

and wrinkled nuclei. Chromatin was coarse and granular.

Case 2.—Mrs. T. T., aged 43, para 12, was admitted to the hospital in coma 36 hours after delivery. The first two trimesters of this pregnancy were asymptomatic, except for moderate nausea and vomiting early in pregnancy and persistent and obstinate constipation. Three weeks before delivery the patient thought she had "flu." This was followed in a week or ten days by headaches of increasing severity and later by swelling of the feet and ankles. Six days before delivery the patient had spots before her eyes, nausea and vomiting, the latter progressing to the extent that nothing remained in the stomach for 24 hours prior to labor. The day before delivery she was first noted to be jaundiced and complained of epigastric discomfort. Labor ensued, lasted 9 hours, and delivery was spontaneous at home, attended by the physician but without anesthesia. Three hours after delivery the patient became maniacal, having to be held in bed, but soon lapsed into a profound coma, interrupted by episodes of extreme restlessness. All informants denied that the patient had had any medication.

Examination revealed a well-nourished hyposthenic patient, markedly jaundiced, temperature 97.8°, pulse 86, respirations 24, who could not be aroused. The skin was cool, but not markedly dehydrated. The eyeballs were soft, fundi negative; heart normal; blood pressure 140/90. The abdominal wall was relaxed with the uterus below the umbilicus and firm. Liver dullness was perceptible in the mid-clavicular line, obtainable only between the fifth and seventh intercostal spaces. Laboratory findings showed hemoglobin 13 gm., red cells 4,200,000, white cells 17,600; Kahn and Wassermann negative; icteric index elevated, biphasic van den Bergh, a high blood guanidine, no conjugated phenols and free blood phenols of 6.37 mgm.[3] Complete laboratory data, followed during treatment, are given in *Chart 2*. Urinalysis showed 2+ albuminuria, with occasional hyaline casts and a positive test for bile.

Treatment consisted of continuous intravenous drip of 10 per cent glucose which was regulated to flow at 2-4 c. c. per minute. After a few hours the patient became very restless and required morphia. Her clinical course the first few days consisted of profound stupor, interrupted from time to time by periods of 30 40 minutes, when she became quite restless; in fact, maniacal, requiring drastic sedatives. These episodes seem to correspond to times when the intravenous drip was discontinued because of being clogged up or for another reason. Additional treatment consisted of unsuccessful attempts to administer corn syrup by mouth, colonic irrigations, sodium phenobarbital for restlessness, calcium gluconate 10-20 c. c. 7.5 per cent twice daily, constant catheter drainage with an attempt to have sugar spilling constantly in the urine. The only detectable change in the patient's condition during the first five days was possibly that she was steadily growing weaker and that the liver dullness was practically undetectable (*Fig. 1*). Blood chemical studies were done frequently, and showed essentially no change, except that a small amount of conjugated phenol appeared in the blood and the serum proteins dropped from 7 to 5 grams. Slight changes in uric acid, urea nitrogen and nonprotein nitrogen are within normal limits. However, leucine and tyrosine crystals were found in the urine. On the fifth hospital day the patient was moribund, even corneal reflexes being absent. Constant attention was given her and often 2-4 ampules of caffeine sodium benzoate were given intravenously in an attempt to stimulate her to a few more minutes of life. In spite of this, on the sixth day a definite improvement could be detected, as evidenced by less stupor and a more nearly normal pulse and respiration. A transfusion was given, after which she showed a rather striking improvement.

CHEMICAL CHANGES IN BLOOD

	2/23/37	2/25/37	2/26/37	3/3/37	3/19/37	3/29/37	4/14/37	4/21/39
Urea nitrogen	7.0	8.5	11.0	10.0	11.0			
Uric acid	3.0	1.8	2.1	2.9	2.7		4.4	
Creatinine	1.15	1.0	1.03				1.25	
Icteric index	50	50	50	50	30	15		5
Carbon dioxide	53.2	59.8	52.2	54.1	57.0			
van den Bergh	Biphasic	Biphasic						
Total serum protein	7.07	6.62	5.03	4.80	5.72		8.15	
Albumin	3.61	2.82	2.65	2.31	3.11		4.01	
Globulin	3.46	3.80	2.65	2.42	2.61		4.14	
Sodium chloride	478	445	391	429	470		404	
Sugar		60	333	100	95		87	
Total phenol	6.37			7.6				3.6
Conjugated phenol	0			.86				0.7
Free phenol	6.37			6.8				
Calcium		8.5	8.9	7.2	8.5		10.1	
Phosphorus		3.14			3.12		3.95	
Cholesterol		208		143			227	
N. P. N.	34?	31.5	28	26	23		30	
Guanidine	.67							.39
Hemoglobin	13.0			11.2				
Clotting time	7			4				
Bleeding time				3.5				

Chart 2

She was able to take fruit juice on the seventh day, but the previously outlined treatment was continued.

During the next few days blood transfusions were given almost every day. A diet containing all the essentials was given, but, in spite of this, the patient developed a blood stream infection of B. coli communis, which was preceded by a pyelocystitis. This cleared up after a rather stormy ten days, the liver increasing in size and the jaundice disappearing rather slowly, as evidenced by an icteric index of 15, forty days after admission. A further complication was a bilateral median nerve neuritis resulting in a mild atrophy of the muscles of the hand, in spite of physiotherapy instituted after the acute stage and continued after the patient's discharge. The patient was discharged after 60 days of hospitalization in good condition. The liver shadow and physical size had returned to normal (*Fig. 2*). The blood changes throughout the protracted illness are given in *Chart 2*. Blood phenol findings two years after discharge are included for contrast.

DISCUSSION

In the first case the diagnosis was made from the clinical picture plus the blood guanidine findings[3,4] and the postmortem examination. The second case shows the identical picture, without the terminal change in nitrogen retention. The guanidine is not so high as the first case, but the absence of conjugated phenol[5,6] and the presence of free phenol concentration of 6.37 mgm. per cent is, when associated with presence of leucine and tyrosine crystals in the urine, prolonged clotting time and x-ray evidence of profound hepatic change, we believe diagnostic. The latter changes are similar to those reported by Starky.[7] The chemical changes correspond particularly to those described by Stander[1] and others,[8] except for the uric acid which, if anything, was decreased slightly in the latter case. Fortunately, there is no question that the recovery followed a rapid regeneration of the liver tissue, which was evidenced by the blood chemical findings and x-ray photographs. Our treatment, therefore, probably only enhanced the ability of the liver to regenerate liver tissue by supplying ample glucose which unquestionably is most useful. That the last

Fig. 1
X-ray of *Case 2* taken shortly after admission showing a marked reduction in liver size.

Fig. 2
X-ray of *Case 2* taken just before discharge showing by comparison a normal liver shadow.

case was not so severe as the first could only be ascertained by the end result, as the clinical picture is essentially similar.

SUMMARY

(1) Two cases of acute yellow atrophy associated only with pregnancy are presented with clinical and laboratory findings and treatment.

(2) The usual chemical causes can be excluded from these cases.

(3) The recovery in one case we believe is related to the constant administration of glucose and to the probable lesser extent of liver injury.*

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THE THERAPY OF LYMPHOGRANULOMA VENEREUM*

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Lymphogranuloma venereum as an entity and the method of diagnosis are quite well established. The therapeutic measures, however, have lagged far behind. The large number of procedures in vogue bespeaks the fact that none is entirely satisfactory. To a certain extent,

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however, the variety of therapeutics is a consequence of the various aspects by which this disease may present itself. The following critical account is based upon the experience of our clinic. Many of its details have been published before by Greenblatt, Sydenstricker, Pund, Sanderson and Torpin.[1] [2]

Methods.—The methods employed may be divided as follows: (1) topical treatment, (2) surgical treatment, (3) proteinotherapy, (a) nonspecific proteinotherapy, (b) convalescent serum, (4) vaccinotherapy, (5) chemotherapy, (6) physiotherapy.

Two hundred and two patients with lymphogranuloma venereum, observed in our clinic between 1936 and 1940, form the basis of this survey. (The incidence of the disease was considerably higher, for a large group of patients is not included in this study, since they attended another clinic.) Different modes of treatment were attempted on various occasions so that the number of therapeutic trials is far greater than the number of patients on hand. In evaluating therapy three points must be taken into account:

(1) The tendency to spontaneous healing which is greatest in bubo but less in ulcerations and absent in elephantiasis and rectal stricture.[3]

(2) The marked variation in the rate of progress of untreated active lesions.

(3) The irregularity in attendance of many patients.

(1) *Topical Therapy.*—Topical treatment of ulcers beyond cleanliness and protection, such as dusting powders, iontophoresis, cauterization, antiseptics, is both unnecessary and ineffective. Only secondary fusospirochetosis must be treated, preferably with a mixture of codliver oil and zinc peroxide or with a solution of codliver oil-neoarsphenamine in glycerine.[4] Relief of the acute symptoms of the bubo may be obtained by hot or cold applications, but chronic infiltration and fistulization remain uninfluenced.

(2) *Surgical Treatment.*—The bubo must not be incised. Where local complaints call for immediate relief or where perforation is imminent, the pus should be aspirated. This gives the same instantaneous effect, creates a better wound, and furnishes sterile material for Frei antigen.

The total extirpation of the glands is an effective way of terminating the entire infection,[5] [6] and formerly this was occasionally employed in our hospital. Such a procedure, however, requires long and expensive hospitalization. Lymphatic obstruction may follow this mode of therapy, and this is manifested by chronic elephantiasis of the pudenda. Considering the high incidence of spontaneous healing and the good results of other types of treatment, extirpation of buboes should be performed in rare instances only.

Excision of exuberant growths, polypoid excrescences and elephantiasis vulvae is advisable. The persistence of the effect depends upon the behavior of the remaining morbid tissue as the complete extirpation of elephantiasic tissue is impossible.

Dilatation of rectal stricture, also, may be classified as a surgical procedure. It has been employed as the method of choice in our clinic and has been performed in 20 cases without any other treatment. The results were as follows: in 5 patients the improvement was such that laxatives could be discontinued, in 2 the lesions progressed and in the remainder some degree of relief was enjoyed (*Chart 6*). Altogether, dilatation was sufficiently helpful to exclude colostomy from our therapeutic program in the past few years. The dilatation was performed once a week, cautiously using the index finger. In one stricture which could not admit the finger, it was possible to break up the loose fibrous tissue. Analgesic suppositories were administered and the procedure was repeated four weeks later. Without further treatment, the condition was found favorable after a year.

In contradistinction to these local therapeutic procedures other modes of therapy aim at combating the infection itself and increasing the resistance of the patient. (The necessity of wholesome food must be stressed where malnutrition and vitamin deficiency go along with chronic debilitating ulcerations.)

(3) *Nonspecific Proteinotherapy.*—(a) Milk or nonspecific vaccine injections have some effect upon acute buboes, but are ineffective with respect to chronic lesions.[6] (b) Treatment with convalescent serum or whole blood appeared somewhat successful in several cases. Since whole blood gave a much better result than serum, we hesitate to classify this procedure as a specific therapy, based upon the effect of antibodies. In a woman with colitis and rectal stricture, two transfusions from her sometime infected husband yielded remarkable results regarding pain and procto-leukorrhea. After one-half year some degree of relapse occurred which responded readily to a course of sulfanilamide.

(4) *Vaccinotherapy.*—The therapeutic use of injections of Frei antigen was recommended by a number of authors.[5 7 8 9 10 11]

VACCINOTHERAPY (1)

INTRACUTANEOUS AND SUBCUTANEOUS

63 Cases

	Total	Healed	Improved	Unchanged
Bubo	30	17	9	4
Early ulceration	8	3	2 (a)	3 (b)
Late ulceration elephantiasis	12	1	5 (c)	6
Rectal stricture	13	—	6 (d)	7

(a) One patient was healed when seen later. (b) Two patients were cured by subsequent chemotherapy. (c) Decided improvement in one, moderate in the others. One patient healed subsequently. (d) Except for one case, the improvement was slight.

Chart 1

In our clinic 63 patients were treated with subcutaneous and/or intracutaneous injections of Frei antigen (pus) without any other therapy. In the group, there were thirty with bubo, eight with early ulceration or early elephantiasis, twelve with chronic elephantiasis, thirteen with rectal stricture.

Buboes.—Of the 30 patients with buboes, 26 were healed or were quite improved. The results of such therapy, it must be stressed, cannot be completely evaluated because the tendency to spontaneous healing is frequent in buboes. It may be said that several of them were more or less persistent before treatment was begun. A patient presented a bubonulus of the penis, a bubo-like infiltration and suppuration along the course of the lymphatics. Frei antigen was injected in the vicinity of the lesion. As was expected, marked local, focal and general reactions occurred and the lesion healed rapidly. Four patients were not influenced during courses of such therapy of four to eight weeks' duration.

Ulcerations.—Of twenty ulcerative or elephantiasic lesions two ulcers of the cervix, one penile ulcer, one chronic elephantiasis were the only ones that healed under vaccinotherapy. The patient with chronic elephantiasis (4+ Frei test) had concomitant granuloma inguinale. Only the lesions of lymphogranuloma venereum responded to vaccine therapy. The granuloma inguinale finally disappeared after fuadin medication. The healing of the penile ulcer was rapid and followed one injection of antigen made in the vicinity of the lesion. In a case of elephantiasis vulvae, the lesions were much improved, but not healed (*Fig. 1*). Nine patients with ulcerative or elephantiasic lesions were not benefited by the therapy. It is important to note that several of them were much improved by chemotherapy some time later. The lesions in two women were influenced by unfinished courses of vaccinotherapy, but relapses occurred shortly after discontinuation.

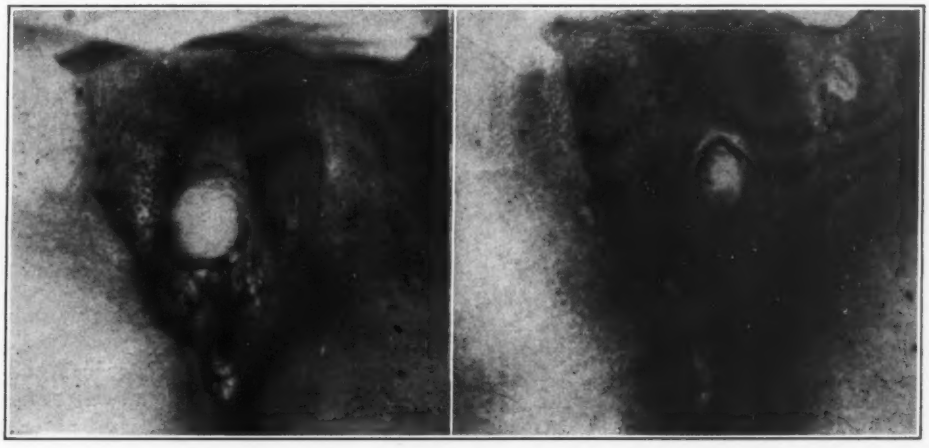

Fig. 1

Results with subcutaneous and intradermal Frei antigen treatment.

On the other hand, in two patients who had not responded satisfactorily the lesions healed later.

Stricture.—The limited value of this therapy in late manifestations is illustrated by the observation that in two cases the first symptoms of rectal stricture appeared during vaccinotherapy for elephantiasis. Accordingly, of thirteen patients with rectal stricture only one had a good result. It seemed, however, that some strictures became softer and more accessible for dilatation.

Summarizing, we may say that subcutaneous or intracutaneous vaccinotherapy is effective only in the recent stages of the disease. In the chronic manifestations, it did not fulfill our expectations. The theoretical appeal of this therapy has apparently influenced some of the reports. It should be remembered, therefore, that the very fundaments of vaccinotherapy are uncertain. The frequent development of persistent infiltration and even necrosis at the site of injection is an additional disadvantage.

Intravenous Frei Antigen.—If focal reaction, as several of our cases seem to confirm, is an important factor in vaccinotherapy, intravenous administration should be promising. The method has been recommended by several authors who used human pus antigen as well as brain emulsion from infected mice. A most extensive study was given this procedure by Kornblith.[10] We were particularly anxious to evaluate this form of therapy. Mouse brain antigen in special dilutions for this purpose was prepared for us by Lederle Laboratories, Inc. Eight selected cases with chronic lesions were hospitalized from 15 to 42 days and carefully studied as to focal and general reactions, serum proteins and blood picture changes.

VACCINOTHERAPY (2)

INTRAVENOUS
8 Cases

	Total	Improved	Subjectively Improved	Unchanged
Ulceration fistulization	3	2*	1	—
Ulceration and granuloma inguinale	1	—	—	1
Rectal stricture	4	4†	—	—

*One had relapse after discontinuation. †Two were only slightly improved.

Chart 2

All of the patients gave focal reactions and all but one were, in a measure, favorably influenced. In three instances (2 rectal strictures and 1 persistent penile ulcer), the improvement was considerable, in three (2 rectal strictures and 1 chronic suppurating bubo in a male) it was slight. A patient with esthiomene had only subjective relief, another patient with simultaneous infection by granuloma inguinale and lymphogranuloma venereum was not benefited.

The injections produced fever in all cases, but not after each injection. The specific character of the reaction is not fully established, since fever was obtained in several trials after the injection of brain emulsion from normal mice (*Chart 3*).

The time interval between injections and onset of fever, the duration and height of the latter, the alternation of reaction and non-reaction after each injection, the effect upon the albumin: globulin ratio as well as upon the white blood cells were very irregular. Sometimes a double peak of the fever curve was seen, one after a few hours and one on the following day (*Chart 4*).

Focal reactions consisted of temporary increase in drainage and pain, and in the rectal strictures, also diarrhea, especially during the fever. Improvement of rectal stricture was seen as softening of the tissue with freer passage, with subsequent cessation of drainage and pain. The penile ulcer which had been present for a year healed temporarily.

In spite of these favorable statements, which are consistent with Kornblith's reports, intravenous vaccinotherapy cannot be recommended as a routine procedure. The results are marked, but not final, and, therefore, do not justify the expense of hospitalization. Perhaps repeated courses of such intravenous therapy may yield more permanent results. It might be advisable to use this mode of therapy in patients where all other therapeutical trials have failed, and such cases are frequently encountered. The best results may be obtained by having chemotherapy follow the focal reaction that is usually provoked by intravenous injection of vaccine.

(5) *Chemotherapy.*—The following drugs have been used in our clinic: sulfanilamide, sulfabenamide,* sulfapyridine, sulfanilic acid and sulfathiazole and the antimony preparations fuadin and anthiomaline.

*Sulfabenamide is a French preparation, 4-n-capro-amido-benzenesulfonhydroxamide.

(a) Following the investigation by Levaditi,[12] [13] sulfanilamide and its compounds have been accepted readily by numerous authors for the treatment of lymphogranuloma venereum (for references see R. O. Stein[14]). The preparations mostly used in our clinic were sulfanilamide with magnesium oxide and sulfanilamide with sodium bicarbonate (*Chart 5*). In 81 patients these drugs were used to the exclusion of other medication. Of these, 42 had acute buboes and 4 had chronic buboes. There were 9 with recent ulcers and 9 with chronic ulcerations and elephantiasis and 15 had rectal strictures. An additional number received the drug in combination with other treatment. The side effects consisted in nausea and giddiness and in a few instances the treatment could not be carried through, but no severe incidents occurred. The concentration of the drug in the blood was determined only in the beginning of our investigation. Later on, the administration of the drug

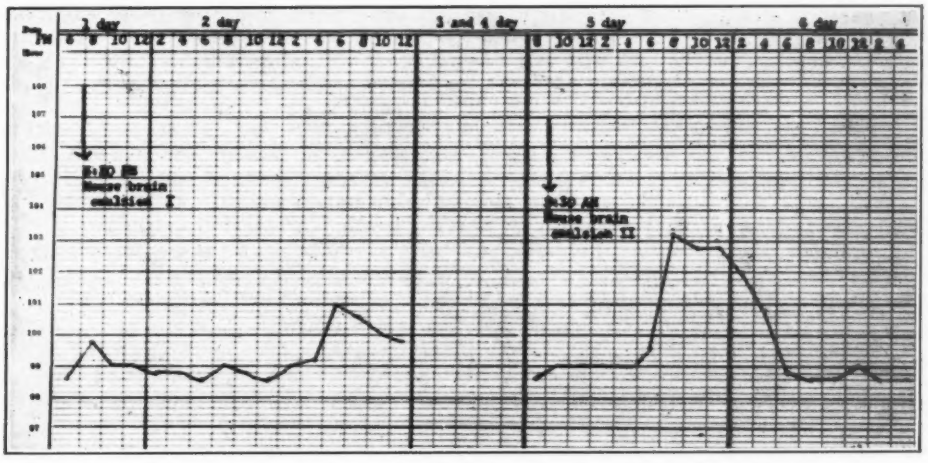

Chart 3

Patient, A. W. Lymphogranuloma venereum. Rectal stricture. Brain emulsion from normal mice. Concentration corresponding to those of the therapeutic preparation.

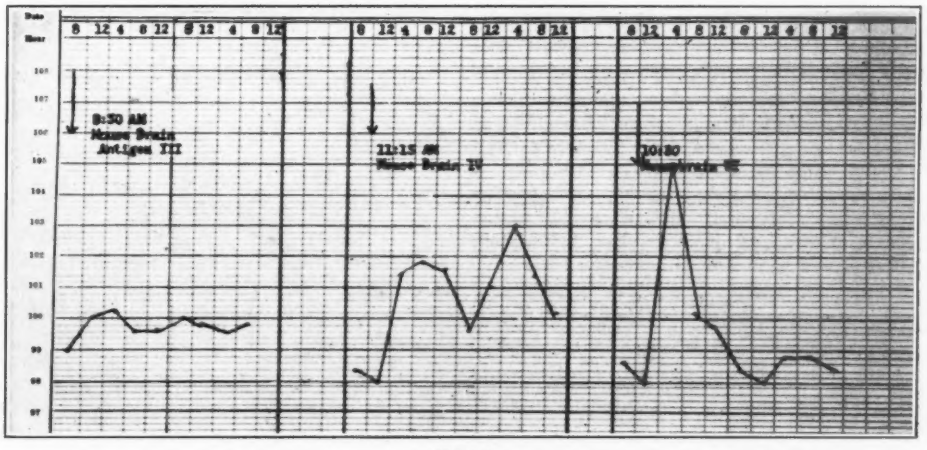

Chart 4

Patient, M. J. Lymphogranuloma venereum. Rectal stricture. Brain emulsion from infected mice. Three different types of reaction in one patient.

was directed by the clinical effect and by the tolerance on the part of the patient.

CHEMOTHERAPY (1)

SULFANILAMIDE +MgO, SULFANILAMIDE +$NaHCO_3$

81 Cases

	Total	Healed	Improved	Unchanged
Acute bubo	42	10	27	5
Chronic bubo	4	1	2	1
Early ulceration	9	3	4*	2
Late ulceration, elephantiasis	9	3	—	6
Rectal stricture	17	1	15†	1

*Two were healed when seen later. †Improvement of rectal stricture refers to pain, secretion and general complaints.

Chart 5

Buboes.—Among 42 recent buboes, 10 were healed after 50-240 five-grain tablets in 7 to 42 days. Five patients were not improved during treatment, the remainder were improved in various degrees at the time when they became delinquent. Statistically this result is about identical with that of vaccinotherapy. On critical analysis, however, judgment shifts in favor of chemotherapy. Healing sometimes occurred after slight treatment, but insufficient results were seen only after insufficient therapy except for one case. Pain, discharge, fever and general complaints often subsided within two days. Where treatment failed, the patients were not only insufficiently treated, but also insufficiently controlled. Two of them, and five of the improved patients, were seen later and were completely healed. From these and other observations the conclusion may be drawn that uncompleted treatment may give some patients a start whereafter improvement proceeds spontaneously.

Buboes of long standing were more resistant and only one of the four patients healed under chemotherapy. This result required 340 tablets in 70 days.

Ulcerations.—Of 9 patients with early (non-transient) ulcers, 3 patients, one of whom had not responded to vaccinotherapy, healed after 32 to 180 tablets in 7 to 28 days. Four patients failed to return as soon as some improvement occurred. Here again, two were healed when seen several weeks later.

Esthiomene.—Of 9 patients with chronic lesions, 6 failures were observed, but in 3 a surprisingly good result was obtained: (1) an elephantiasic ulcer of the vulva of one year's duration improved within a few days and under scarce and irregular treatment, progressively healed within a year. (2) A marked elephantiasis, unsuccessfully treated with vaccine, healed after 130 tablets of sulfanilamide. (3) In a woman several chronic peri-anal ulcers disappeared along with general complaints, after 110 tablets of sulfanilamide; the concomitant rectal stricture was but slightly improved.

Strictures.—In rectal stricture, pain, rectal leukorrhea and general symptoms were affected after various dosage and time. On the average 60 to 100 tablets and 2-4 weeks were required. Only one of the 17 cases was not influenced at all. In several patients the rectal leukorrhea was arrested for many months. In only one case did the actual stricture disappear (4 weeks after treatment with 120 tablets in 50 days). The stricture had been present for a year.

On the basis of this experience, combination of dilatation and chemotherapy yielded rather satisfactory results (*Chart 6*).

It may be said that patients subjected to such therapy may expect considerable relief for varying lengths of time. Altogether, the administration of sulfanilamide in lymphogranuloma venereum is relatively inexpensive, comparatively effective and in general rather well tolerated.

(b) Sulfabenamide is a new drug in the sulfonamide group, was tried in 21 patients of whom 11 had buboes, 6 had ulcerations, and 2 had rectal stricture. Five of the 11 buboes healed, 3 improved, and 3 chronic buboes were not influenced. Two of the 7 ulcerations healed, 2 improved, and 3 remained unimproved (*Chart 7*).

The effect of the drug seemed somewhat slower than that of the aforementioned compounds, but its tolerance made up for this, since it permitted prolonged treatment.

(c) Sulfapyridine was found unsuitable for ambulatory clinic patients because of disagreeable side effects. Sulfanilic acid was well tolerated, but gave no results in recent cases and seemed to have little effect in chronic cases. However, attention is drawn to the excellent report of Hebb, Sullivan and Felton[15] in the treatment of chronic cases over long periods of time. Continuation through months with this medication was not feasible in our patients. We have no final judgment concerning sulfathiazole. In

TREATMENT OF RECTAL STRICTURE

	Total	Stricture Much Influenced	Stricture Slightly Influenced	Symptoms (pain, discharge, fever) much influenced	Symptoms Slightly Influenced	No Result
Vaccinotherapy	17a	2b	1c	1	5c	8
Chemotherapy	18	1	—	7	9	1
Dilatation	20	5	13	—	—	2
Dilatation plus chemotherapy or vaccinotherapy	22	8	14	Improvement of symptoms in all cases	Improvement of symptoms in all cases	—

(a) Four patients treated intravenously.
(b) Two patients treated intravenously.
(c) One patient treated intravenously.

Chart 6

CHEMOTHERAPY (2)

"SULFABENAMIDE"

21 Cases

	Total	Healed	Improved	Unchanged
Bubo	11	5	3	3*
Ulceration	7	2	2	3
Rectal stricture	3	–	3	–

*Chronic buboes.

Chart 7

a few cases with draining sinuses there was no remarkable cessation of drainage.

(d) The antimony compounds, which have been recommended by a number of authors,[16 17 18] were useless in our experience. Eight to eighteen injections of fuadin or anthiomaline failed to induce any change in 6 patients with elephantiasis or chronic lymphadenitis. In one patient, granuloma inguinale had developed on an older venereal lymphogranuloma bubo. Fuadin cured the granuloma inguinale, but left the fistulization unchanged. Fifty-six tablets of "sulfabenamide" markedly lessened the discharge from the fistulae.

(6) *Physiotherapy.*—Various modes of physiotherapy have been recommended. The effect of x-ray treatment was particularly emphasized by J. O. Martin and A. A. DeLorimia.[19] In our experience this therapy was of no use in chronic manifestations. In buboes, it sometimes hastens suppuration. The final results were less favorable than those obtained by chemotherapy or vaccinotherapy. For this reason, x-radiation was tried out in a small number of patients only.

According to Martz and Foote,[20] long-wave diathermy is very effective in rectal stricture. In our clinic short-wave treatment is under examination. The older diathermy offers the advantage that metallic Hegar's dilators may be used as a convenient set of rectal electrodes which facilitates the combination of diathermy and dilatation. In short-wave diathermy, on the other hand, the coil electrode is of considerable value. It may be applied in irritable rectal strictures for the first few treatments and substituted by the rectal electrode as soon as the inflammatory process has improved. Short-wave therapy is also preferable where exact adaptation of the active electrode is not feasible, for example, in genital ulceration. Our experience is preliminary only. The almost immediate relief of pain or discomfort was the most striking effect of short-wave application whether the coil or the rectal electrode was used. In consequence of this a series of 2-3 applications, which evidently could not change the actual stenosis, brought about marked improvement of constipation in five rectal strictures. A similar effect was obtained in a woman with urethral syndrome and painful urination. Genital ulcerations, too, were benefited by this quick effect, which was highly praised by the patients. As for permanent results, our experience is limited. The tissue of strictures becomes softer under this treatment, but it seems that combination with dilatation is necessary for definite widening. In one patient the stricture was not accessible before treatment and the rectal electrode

could not be introduced. After eight treatments with the coil in four weeks, the tip of the index finger could be forced through the stricture, after seven weeks the finger passed easily and the rectal electrode could be used. The results until now are favorable enough to warrant continuation.

SUMMARY

Bubo.—The acute bubo of lymphogranuloma venereum is profoundly influenced by chemotherapy with sulfanilamide and its derivatives and compounds. Late manifestations do not occur after intensive early treatment, but it must be emphasized that chronic lesions, especially rectal strictures, often develop without preceding acute manifestations. Vaccinotherapy is also effective in the acute stage, but to a lesser degree. Surgical procedures, except for aspiration of pus, are rarely indicated.

Ulcerations and Elephantiasis.—Ulcerative and hyperplastic lesions are less favorably influenced. Those of short duration usually yield to prolonged chemotherapy, possibly reinforced by vaccinotherapy or physiotherapy. Chronic ulceration and elephantiasis are, however, resistant to therapy. Chemotherapy is often effective as to pain and discharge and may combat progression, but only occasionally produces a definite result. Symptomatic improvement may also be accomplished by intravenous vaccinotherapy or physiotherapy. The removal of hypertrophic tissue usually allows good and often persistent results, especially if combined with chemotherapy.

Rectal Stricture.—In rectal stricture, pain, rectal leukorrhea and general complaints respond, and often completely yield to chemotherapy. Stenosis is influenced by mechanical dilatation. The combination of mechanical dilatation and chemotherapy is highly recommended. Long- or short-wave diathermy has a favorable effect on the inflammatory process and allows the stenotic lumen to undergo softening. Here, too, the combination with mechanical dilatation is recommended.

In recapitulation, it may be said that patients seen in the acute stage of lymphogranuloma venereum may expect complete healing. The treatment of neglected lesions or those developing without a preceding acute stage is less promising, but the therapeutic procedures available at the present time are sufficient to lessen many complaints and to create a tolerable situation for most of the patients, much more so than could be provided in the past.

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DISCUSSION (*Abstract*)

Dr. J. Ullman Reaves, Mobile, Ala.—As lymphogranuloma venereum is given scientific observation by more men, the proper treatment for the presenting pathology of a given case is becoming more nearly standardized. These cases for the most part are distasteful and uncleanly, and it is hard for the average clinician to look through this veil and see the chance for scientific endeavor which lies just beyond.

Lymphogranuloma venereum is a disease which presents a varied pathology all the way from buboes which have a tendency to heal spontaneously to elephantiasis with or without deep lymphatic involvement with the surrounding tissue menaced by a spread of secondary infection and lymphatic stasis.

We have always fought shy of using Frei antigen as a

therapeutic agent in these cases. We note that Dr. Brandt has used it as subcutaneous, and/or intracutaneous injections effectively in some instances, but in general it was disappointing. Some workers have been bold enough to use it intravenously. Until this procedure is proven to be of real value, we prefer to let the list of our therapeutic measures be made up with the deletion of this particular procedure.

In using Frei antigen therapeutically, hospitalization is necessary, and we consider the economic problem involved of more importance than a procedure which the most ardent followers fail to recommend to be of enough value to be used routinely.

Cleanliness, with surgery when indicated, together with chemotherapy, is the procedure of choice. Simple dilatation of rectal strictures which occur in these cases has not been lasting in our hands. The ones which we have been able to follow up have recontracted unless continued dilatation was instituted. We were greatly impressed by the treatment outlined by Hebb, Sullivan and Felton, and later by a personal interview with Herbst, wherein he administered sulfanilic acid by mouth and was rewarded with remarkable results. Six months ago we adopted this drug as our chemical therapeutic agent and are more than pleased with the results. Ulcerations have healed more readily. The course of the bubo has been shortened and dense rectal strictures have been softened to such an extent that the cathartic the given case was accustomed to taking could be dispensed with.

We believe that the simpler the therapeutic measures which are used in these cases, the quicker and more lasting will be the results obtained. Unfortunately, the length of time it takes to cure these cases is at great variance, due in part to the resistance of the patient as well as the progress the disease has attained before the therapy is instituted.

Dr. Brandt (*closing*).—Most of our vaccines were administered subcutaneously and intracutaneously. A series of patients, as stated in this paper, was treated intravenously. Our results with sulfanilic acid were unsatisfactory, but we must admit that the drug was not given continuously for periods of 7-9 months as has been suggested. We have not treated lesions locally with sulfanilamide.

SPONTANEOUS SUBARACHNOID HEMORRHAGE*

By CARROL C. TURNER, B.S., M.D., F.A.C.P.
Memphis, Tennessee

Blood in the cerebrospinal subarachnoid space may originate from a number of conditions. Intraventricular hemorrhage may find its way by means of the usual exits from the ventricles into the subarachnoid space. Vascular types of tumors may permeate the subpial glia and its outer envelopes and weep into the subarachnoid space. Hemorrhagic encephalitis of Strumpell may pass red blood cells into the subarachnoid space from the engorged and hyperemic perivascular spaces. Head injuries in which the brain and its envelopes have been lacerated give bloody spinal fluid. In such dyscrasias as hemorrhagic purpura, pernicious anemia and hemophylia, blood may seep into the subarachnoid space by diapedesis or extravasation. The most common type of bleeding into the central nervous system in purpura hemorrhagica is capillary ring hemorrhagica, so-called brain purpura. Spontaneous cortical hemorrhage occurring over the convexity of the brain is a rarer condition and most usually is seen in children. One such case occurred complicating hypoglycemic shock treatment in a patient with schizophrenia.

Subarachnoid hemorrhage may and does occur in older people in whom arteriovascular disease of a degenerative type is present in the intracranial vascular tree. Associated with hypertension, there must be added a sudden change in psychophysiologic activity such as effort or emotion. Averages seem, however, to favor younger persons, and the highest age incidence is in the third decade. Thirty years was the average in 114 cases by Symonds. However, Conway and Gull found the condition to occur more frequently after 40 years. In the young the majority of cases of subarachnoid hemorrhage are due to rupture of an intracranial aneurysm. These usually occur in or from one of the immediate branches of the circle of Willis, which accounts for the basilar location of these hemorrhages. Of 166 cases autopsied of Osler, Lebert, Durand and Bartholow, the middle cerebral artery was the site of the aneurysm in forty cases; the basilar artery in forty-four; the internal carotid in twenty-four; anterior cerebral in fourteen; the posterior communicating in eight; the anterior communicating in eleven; the vertebral in seven; the posterior cerebral in six, and the inferior cerebellar in three.

Aneurysms are more common in cerebral than in systemic vessels, because the former are large, thin walled, bearing high pressure. The aneurysms are usually saccular, or berry, aneurysms and seem to be due to congenital defects of the media of the artery, particularly at angulations, or sudden turns in the direction of the artery, or where the artery gives off branches. Forbes has shown that developmental defects occur in the media at these points. The weakened area resists changes until in young adult life, when the blood pressure rises, it gives way to an aneurysm.

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Thirty-Fourth Annual Meeting, Louisville, Kentucky, November 12-15, 1940.

Another hypothesis has been offered to explain intracranial aneurysms. The opposite paired vessel to the one on which the aneurysm is situated may be aplastic and of smaller caliber. In this way the force of the blood stream is thrown on the normal artery, and after a time regression of the wall of the normal artery may result in aneurysm.

Eppinger classified cerebral aneurysms as congenital, parasitic (including mycotic emboli) and simple or traumatic. Charcot and Bouchard considered miliary aneurysms as the result of periarteritis. Their teaching denied the role of endarterial changes, such as occur in arteriosclerosis or atheromatosis. More recently Ayer concurred in this idea by suggesting that an aneurysm can be a sequel to previous head injury, where torn membranes may establish adhesions between themselves and the periarterial tissues of neighboring vessels. The torsion of such adhesions serves to form pouches and in this way weakens the vessel locally. According to Eppinger, regardless of the cause, the regular phenomenon in an aneurysm is an interruption of the elastico-muscular layer. We would like here to emphasize the experience and teaching of others, as well as our own, namely: that syphilis, or arteriosclerosis, rarely plays a part in the etiology of these aneurysms. Either of these affections of the blood vessels produces vascular changes quite different from saccular aneurysms. Miliary aneurysms, which really belong to another discussion, are associated with atheromatosis.

Probably a large number of intracranial aneurysms exist unrecognized, since their size and location may prevent any neurologic evidence. However, these may be responsible for some of the headaches which are ascribed to ophthalmic migraine, allergic and psychogenic causes. Certain it is that headache is a frequent prodrome in cases of verified intracranial aneurysms which go unrecognized until the fatal termination from their rupture reveals the true cause. Intracranial aneurysms may be demonstrated by injecting thorium dioxide into the cerebral circulation and obtaining an arteriogram. If intracranial aneurysms attain sufficient size, or are near the thin plate of the temporal bone, stethoscopic examination over the area may elicit a bruit. The patient himself may often describe a musical swish in his head which is synchronous with the pulse.

Aneurysms of the internal carotid artery may be diagnosed early by reason of the rather constant pattern of clinical findings associated with these lesions. The intimate relations of the internal carotid artery with the cavernous sinus explains the frequent involvement of the third, fourth, fifth and sixth cranial nerves in an expanding lesion of this vessel such as a saccular aneurysm. The expectant findings are usually present, namely: pain of pulsating character over the whole area subserved by the fifth nerve with ocular palsy on the same side and at times pulsating exophthalmus due to mechanical obstruction from the aneurysm in the cavernous sinus. The pain may or may not be paroxysmal and is accompanied by a certain degree of hypesthesia over that side of the face and head. Jefferson discusses the symptoms of this affection as related to the portion of the artery in the cavernous sinus which contains the aneurysm. Thus he devises a posterior, middle and anterior syndrome of the cavernous sinus.

Even if an aneurysm should attain the proportions of a large space-filling lesion, its gradual development allows a certain amount of compensation to occur, and therefore intracranial pressure signs may be absent.

The symptomatic characteristics of these cases are borne out in the following cases:

Case 1.—G. B., a white man, aged 50, insurance salesman, had suffered for many years from headache. He had noticed that the headache was deep in the bitemporal axis and was throbbing in character. On August 15, 1934, he came in for consultation holding his head in a vise-like manner between his hands. His facial expression was that of anxiety and a facial pallor was obvious. He gave no evidence of shock, however, and physical and neurologic investigations in the office were negative. He was instructed to go home and lie down with cold applications to his head, following which he was sufficiently relieved to fall asleep. That evening the headache returned. Before retiring he went out to put up his car. He was found dead several hours later, lying face down on the driveway.

Autopsy disclosed a large hemorrhage at the base which had welled up and encased both frontal lobes. Dissection of the circle and its branches revealed a ruptured aneurysm of the right lateral cerebral artery. The aneurysm was about the size of a small pea, measuring 4 mm. in diameter. Its position was at the bifurcation of the lateral cerebral artery. The basilar artery contained several atheromatous plaques, but the condition of the remaining intracranial vascular tree was usual for a patient of this age. No marked arteriosclerotic or atherosclerotic changes were present (***Figs. 1, 2, 3***).

Case 2.—M. L., a white man, aged 37, was taken to the hospital September 10, 1934. While attending a picture show the previous evening he developed a headache, which became more and more excruciating. He had been a headache sufferer for a number of years and had had many changes of lenses for "eye strain." He was able to drive his car home, but soon thereafter had a generalized convulsive seizure and lapsed into coma. Twelve hours later consciousness had returned,

but he was quite confused. He was extremely restless and rolled from side to side, holding his head with his hands and moaning. The neck was board-like and the head and extremities resisted flexion and passive movement. Bilateral extensor toe phenomena were present. The ocular fundi were normal. The neurologic examination was otherwise negative, though the pupils were somewhat dilated and limited in constriction to light. The blood pressure was normal. The urine contained a reaction for albumin. Spinal puncture obtained fluid which was practically all fresh blood under pressure. The restless agitation progressed, amounting to a hypermanic state. The blood Kahn was negative. A leukocytosis of 13,080 was present with no relative increase of cell types. His temperature was rising. On the third day, a second spinal drainage obtained xanthochromatic fluid with many small fibrinous clots. The patient became comatose and died on the fourth day. Autopsy was refused.

Case 3.—Mrs. H. M., a white woman, aged 37, telephone operator, was referred from ophthalmology for headache and double vision February 16, 1940. She had suffered headache for five years, described as localized in the right temporal region, with radiation at times posteriorly along the zygoma to the right mandibular articulation. The headache was deep-seated and throbbing, seemed to be relieved after rest in bed, but always aggravated by sudden turning or change of position of the head and in stooping over. She held her head rigidly. Three weeks previously she had developed diplopia. With the appearance of the diplopia, the headaches became less severe. Her fields and fundi were reported to be normal. Physical examination was negative. Blood pressure was 105/70. Neurologic examination revealed weakness of the right lateral rectus and right superior oblique muscles. There was a suggestion of ptosis of the right upper lid, but the pupils were equal and reacted promptly, and there was no weakness of convergence. All tendon reflexes were brisk, but symmetrical. The ocular fundi were normal and there were no field defects, no deafness, tinnitus nor vertigo. There was no anesthesia over the right side of the head and the right corneal reflex was prompt. The blood Wassermann was negative. The patient refused lumbar puncture. X-ray studies of the skull showed a great deal of digitation over the calvarium, producing a beaten silver appearance. There was no intracranial calcification. The mastoids were clear. There was nothing unusual about either petrous apex. The sutures were not separated and the sella was of normal proportions. No definite relief was obtained from symptomatic treatment and the patient finally consented to lumbar puncture three weeks after she was first seen. The fluid was clear, xanthochromatic, with a pressure of 60 mm. of water. It contained a few small, well organized clots. Sugar was 41.6 mg. The Wassermann was negative. The urine contained no albumin and was otherwise normal. The puncture intensified the headache, which became more occipital and radiated down the neck. This lasted for six days, after which the patient felt well enough to return home from the hospital.

On March 29, 1940, while using the telephone, she suddenly screamed and fell to the floor unconscious. A hard generalized convulsion ensued, after which the patient was stuporous and incoherent. She was readmitted to the hospital in shock. Realizing that we were dealing with a recurrent bleeding from an aneurysm, neurosurgical consultation was obtained and spinal puncture obtained fluid practically all blood. Only a few drops were allowed to escape before concluding the puncture. The patient showed marked rigidity of the

Fig. 1, Case 1
Showing massive hemorrhage over base of brain.

Fig. 2, Case 1
Hemorrhage welling up over and encasing both frontal lobes.

neck and resistance of the extremities. The fundi were normal. She complained intensely of headache and was so restless that physical restraint and deep sedation were necessary. She suddenly died March 31, 1940. Autopsy revealed blood clots along the right basilar surface between the cerebrum and cerebellum. The superior cerebellar artery presented a small aneurysm filled with blood clots, measuring 3 mm. in diameter, 2 cm. from its origin from the basilar artery. The remaining blood vessels were free from sclerotic or atheromatous changes. The pia arachnoid was more fibrous than normal (*Fig. 4*).

Case 4.—J. S., a white man, aged 22, was admitted to the hospital in coma November 25, 1930. Ambulance attendants said they had received a call to come to his residence. When they arrived they found him lying on the floor by the telephone with the receiver still down. He vomited once after arrival at the hospital. He had suffered a basilar fracture in a motorcycle accident three years previously. His recovery from this accident had been prompt and uneventful, but he had suffered with headaches ever since. His stupor was punctuated with periods of extreme restlessness, requiring restraint to keep him on the bed. The right arm was weak. The neck was stiff and a bilateral Kernig's sign was present. All the tendon reflexes were brisk. On admission the patient was in shock. The following day the blood pressure had risen to 108/80. The pulse was accelerated and bounding. The urinalysis was negative. A leukocytosis of 24,000 was present, with polynuclears 90 per cent. The blood Kahn was negative. The ocular fundi were normal. Spinal puncture revealed fluid practically all blood. During the day the patient had lucid intervals and complained of headache. The neck was very stiff and the head tended to retract. A second spinal drainage was yellow, contained some blood and many small clots. The temperature was steadily rising and the patient again lapsed into deep coma. He died the following morning, two days after onset of his trouble. Autopsy was refused.

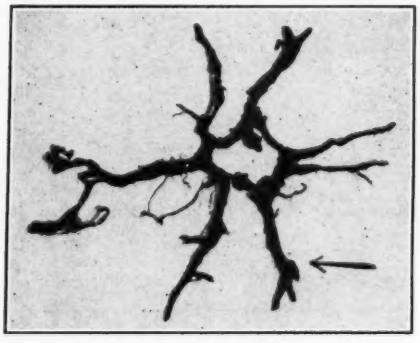

Fig. 3, Case 1
Dissection of circle of Willis with its main branches, showing aneurysm (under arrow) of right middle cerebral artery at its bifurcation.

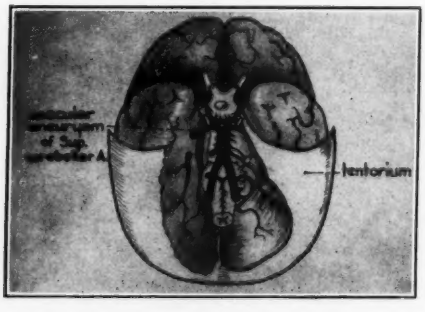

Fig. 4, Case 3
Artist's drawing from specimen, showing aneurysm of right superior cerebellar artery.

Case 5.—C. D. S., a white man, aged 67, was brought to the hospital December 5, 1933, in a semi-stuporous condition. Three hours previously he had lost consciousness simultaneously with the onset of a generalized convulsive seizure. The patient had suffered for a long time from frontal headaches. Examination on admission to hospital revealed a muttering delirium. The neck was stiff. Neurologic signs pointed to a left frontal lobe affection. His temperature was 100, pulse 90, and respiration rate 18. The eye grounds were negative. The urine contained one plus albumin and 20 pus cells. The total white count was 12,400; nonprotein nitrogen, 43 mg. per 100 c. c. of blood; creatinin, 1.5 mgm. per 100 c. c., and blood Kahn negative. Lumbar puncture obtained 10 c. c. of bloody fluid of 10 mm. of mercury pressure. Blood pressure was 190/80. The patient seemed better the next day, was less confused and was well oriented. His progress tended to gradual improvement and after a week he was taking an interest in his surroundings, reading the newspaper, and eating a regular diet. At 2:00 a. m. December 13, 1933, he suddenly collapsed and died.

At autopsy, the brain showed a blood clot in the left frontal region about 1 cm. to the left of the mesial aspect of the left cerebral hemisphere. The clot extended from the interior of the brain and protruded the pia-arachnoid outward and upward by pressure. The size of the clot was 7 cm. in diameter. The cerebral arteries were sclerotic with atheromatosis, evident particularly in the arteries composing the circle. The pathologist reported the hemorrhage as arising from the left anterior cerebral artery (*Fig. 5*).

Case 6.—Mrs. B., a white woman, aged 61, was admitted to the hospital November 18, 1934. The previous day she had just concluded a strenuous automobile trip, doing her share of the driving. Shortly after arriving at a local hotel she was seized with a severe pain in her head and fainted. This was followed by a period of shock. A muttering delirium ensued, which lasted two days.

Examination revealed rigidity of the neck and extremities. The pupils were unequal and sluggish to light. The tendon reflexes were brisk and bilateral unsustained ankle and patellar clonus were present. Restraint was necessary. Lumbar puncture obtained bloody spinal fluid of 15 mm. of mercury pressure. The temperature was 101, urinalysis was normal, and the white blood cells were slightly elevated in a total count. The fundi showed hazy disk margins, with rather full veins, a moderate degree of retinal arteriosclerosis and no hemorrhages. Gradual improvement ensued,

and at the end of a week the patient was lucid, well oriented and cooperative. All symptoms subsided at the end of two weeks. She is still living and well.

Case 7.—This patient, a negro girl, aged 17, lost consciousness while working in a field. When seen several hours later, she was comatose. The neck and extremities were rigid. Lumbar puncture obtained bloody spinal fluid. The patient died after about twelve hours.

At autopsy, the brain was edematous and hyperemic. A cortical subarachnoid hemorrhage about 8 cm. in diameter was present over the vertex, occupying the entire Rolandic area (*Fig. 6*).

Case 8.—Mrs. H. A., aged 65, was admitted to the hospital November 8, 1934. On the day of admission she was seized with a sudden excruciating pain in the top of her head when she stooped over to pick up a flower pot. The pain radiated to the occiput and down the neck. Following immediately the patient suffered extreme weakness, vomited and was bathed in a profuse sweat. She did not lose consciousness and no motor phenomena accompanied or followed the onset. Her past history revealed nervousness with hypertension. We saw her in consultation on the day after her admission to the hospital and the following were noted:

Consciousness was clouded with complete disorientation. The patient was restless and restraint was necessary.

The neck and back muscles were stiff. Bilateral toe phenomena and Kernig's were positive. Blood pressure was 110/60. Pulse and respiration were normal. Lumbar puncture revealed bloody spinal fluid of increasing intensity in each of three tubes.

Leukocytes, red cells and hemoglobin were normal. Urinalysis was negative. Blood Wassermann was negative. X-rays of the skull, sinuses and cervical spine were normal.

Ocular fundi revealed both nerve heads ill defined. The veins of the retinae were abnormally distended. The arteries were smaller than usual and sclerotic.

On the following day ophthalmoscopic examination revealed the disk margins definitely indistinct with a mild degree of papilledema. The patient was more lethargic and temperature was 100° F. per rectum.

There was gradual subsidence of symptoms from this point on. The patient was discharged from the hospital one week after admission, free of symptoms. Two subsequent observations revealed complete recovery, with the eye grounds one month after discharge from the hospital entirely normal. The patient seemed to be perfectly normal for about a year and took an interest in her usual activities, although she suffered frequently from headache. One year later, while doing some odd chores about her home, she screamed and seized her head with both hands. She immediately lost consciousness and died, following a hard generalized seizure. Autopsy was refused.

SUMMARY

(1) Spontaneous subarachnoid hemorrhage may result from a number of different conditions.

(2) It constitutes a frequent type of vascular accident in young adults and children.

(3) In elderly people it is practically always the result of atherosclerotic changes in the blood vessels composing the intracranial arterial system, with or without aneurysmal pouching.

(4) In children, subarachnoid hemorrhage is usually an extravasation of blood over the vertex of the brain and is associated with blood

Fig. 5, Case 5
Hemorrhage into anterior pole of left frontal lobe from left anterior cerebral artery.

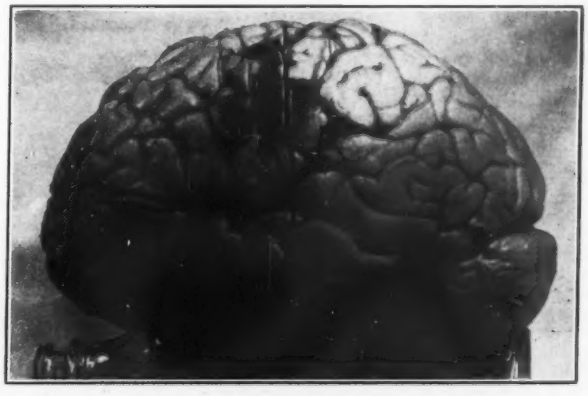

Fig. 6, Case 7
Hemorrhage over cortex of left frontal parietal region.

dyscrasias. In the newborn these hemorrhages occur in evident absence of vitamin K.

(5) In young adults, spontaneous subarachnoid hemorrhage most frequently results from a ruptured aneurysm. These aneurysms occur in one of the components or immediate branches of the circle of Willis. They seem to be the result of an anomaly in the development of the blood vessels. This consists of a poorly developed, or absent, musculo-elastica. These aneurysms occur near sharp bends or at the bifurcations in the arteries.

(6) Aneurysms may be the cause of headaches which are ascribed to other conditions in the absence of any neurological signs.

(7) Intracranial aneurysms probably exist more frequently than they are suspected. They rarely attain sufficient size to produce neurologic signs. Aneurysms of the internal carotid artery may produce paralysis of one or more of the extrinsic muscles of the eye. If the aneurysm of the vessel occurs within the cavernous sinus, the cavernous syndrome of the fifth and third nerves results.

(8) Spontaneous subarachnoid hemorrhages, associated with any condition, is related to a psychophysiologic factor, resulting in emotional tension or effort. This factor has a definite relationship in elevating the blood pressure.

(9) Albuminuria is often found in cases of ruptured aneurysm. No casts are found and no polyuria. This change, first described by Widal, has never been satisfactorily explained.

(10) Subarachnoid hemorrhages may be a medicolegal problem from two standpoints:

(a) Fairly conclusive evidence points to the appearance of aneurysms following trauma to the intracranial structures.

(b) Occupational effort may be the cause of rupture of an existing aneurysm.

DISCUSSION (*Abstract*)

Dr. Frank H. Redwood, Norfolk, Va.—The diagnosis of spontaneous subarachnoid hemorrhage is usually not difficult. Such a diagnosis may be made in an individual who has sudden onset of headache which is severe, followed frequently by nausea and vomiting and varying degrees of stupor or unconsciousness, whose neck is stiff, who has a bilateral Kernig and whose spinal fluid is found to be uniformly bloody. In other words, they present a picture of meningitis with sudden onset.

Leopold seems to have been the first in this country to discuss spontaneous subarachnoid hemorrhage. He reported one case in 1914. In 1926, Neal reported 35 cases collected from the meningitis department of the New York Board of Health and said that few of the physicians concerned with these cases seemed at all familiar with the disorder. In 1927, I read a paper before this section and reported a case which was my first. During the past ten years this has been a rather frequent type of bleeding, not due to trauma, within the cranial cavity.

The consensus is that this type of hemorrhage is due to the rupture of a small aneurysm. The blood is diffused under the arachnoid membrane and becomes mixed with the spinal fluid. If this mixture is rich in blood the symptoms will be profound, and I think that is a good prognostic point.

Dr. Turner has talked about the acute cases only. I wish to call attention to the fact that occasionally these cases become chronic and behave somewhat like a chronic subdural hematoma. That is, they bleed and present the typical picture, with gradual improvement and recovery. In a few days or a week they present the same classical picture with uniformly bloody spinal fluid and gradual recovery. We have had such a case during the past few months. The patient so far has not had a third attack.

I wish to dwell chiefly on the treatment. There has been considerable difference of opinion as to the advisability of repeated spinal punctures. Some authors believe that blood in the subarachnoid space is irritating and interferes with absorption of cerebrospinal fluid which increases intracranial pressure, therefore drainage by repeated spinal punctures is valuable. Others believe that spinal drainage does not in any sense influence the disappearance of blood in the subarachnoid space. We know that in cases of head injury the spinal fluid changes from bloody to xanthochromic in from five to six days. I feel that I did actual harm in one case by doing a spinal puncture too soon and lowering the pressure too much. Generally I believe a diagnostic puncture can safely be done and a pressure reading obtained within eight hours after onset if little fluid is removed. If the mixture is very rich in blood this procedure should not be repeated except where decrease of intracranial pressure seems urgent and the severe headache does not respond to other measures. This can usually be accomplished by intravenous sucrose or magnesium sulphate.

Much has been written on vitamin K and various types of bleeding. Recently we have used vitamin K in several cases. H. M. Doles, in a study of a large number of cases of hypertension, found the prothrombin time increased in all cases which had had a cerebral blowout. In his patients with marked hypertension who had not had a cerebral accident or coronary attack the prothrombin time was normal. This may be a clue in the treatment of spontaneous subarachnoid hemorrhage or in preventing further bleeding after it has once ceased.

Dr. Edward F. Reaser, Huntington, W. Va.—The occurrence of these hemorrhages seems to be becoming more and more recognizable. Litigation may ensue, following one of the hemorrhages. I believe that the best discussion I could offer to Dr. Turner's paper would be, briefly, to skeletonize a case that has come under my observation within recent months.

The patient was a man, aged 37, who was employed in the delivery and installation of furniture. After helping to carry a stove upstairs, during which he exerted a great deal of effort and had his head bent to one side, he was seized with a very severe pain in

the head. However, he was able to connect the stove and return to the warehouse. After returning to the warehouse he went to the toilet room and had a severe convulsion; he was taken to the hospital in shock.

In the hospital, on April 6, following his convulsion and coma, he presented twitching of the jaws and his arms were spastic. His patellars were hyperactive. His blood pressure was 160/90. The following day his spinal fluid was under 375 millimeters of water pressure and was bloody. The x-ray suggested to the roentgenologist the fracture of the odontoid process. That gave rise to some perturbation on the part of the employer, and I was called in consultation and saw the patient the next day, at which time he was comatose, his pupils were small but equal, he had an external squint of the left eye, his reflexes were all absent, including the tendon reflexes of the upper extremities, the superficial abdominal reflexes, cremasterics and knee-jerks. His neck was rigid and there was a positive Kernig sign. The fundi were negative so far as I was able to determine.

We might account for the absence of reflexes, loss of the tendon reflexes and impairment of the abdominals by the increased intracranial pressure.

The following day, April 9, his blood pressure was 168/40, he had a regular pulse, and he opened his eyes and protruded his tongue when told to do so. The tongue deviated to the left. The neck was still rigid; the fundi were still negative. He moved his left limbs spontaneously.

The following day, April 10, he was conscious, but was unable to respond to conversation and he appeared to be improved. However, twenty-four hours later I saw him and he was in a deep coma, his pulse and respiration and temperature had all risen, and he died that day, which was the sixth day after the onset of symptoms. We were able to obtain an autopsy, and we found considerable bleeding. Diagnosis of subarachnoid hemorrhage was made on the first occasion of the examination, and in spite of the roentgenologist's impression that there was a fracture of the odontoid process, considerable discussion arose because of that and the possibility of compensation litigation. As a matter of fact, we found a saccular aneurysm of the anterior communicating artery.

Dr. H. McGuire Doles, Norfolk, Va.—This discussion will not deal with the physical findings and treatment of subarachnoid hemorrhage; I want to show the results of studies of prothrombin time in a series of eighty-seven patients upon whom I have made determinations during the past six months.

A number of the prothrombin determinations were made by the Quick method, but the majority were made by the bedside method devised by Smith and his co-workers at Iowa State University. My prothrombin was made from the lungs of rabbits as outlined by Dr. Smith. This method was found to be very simple and accurate. The normal coagulation time was 25 seconds if the prothrombin had not lost its potency. Controls were run in each case.

For convenience, the patients are here divided into three groups:

Group 1.—Twenty-five patients in whom the blood pressure varied from 90 to 150 systolic; prothrombin time, 25 to 30 seconds, or 100 to 80 per cent of normal; twenty-nine patients in whom the blood pressure was from 150 to 200 systolic, prothrombin time, 100 to 80 per cent of normal; five cases in whom the blood pressure varied from 220 to 250 systolic, prothrombin time 100 to 80 per cent of normal; two cases, blood pressure 250 to 300 systolic, prothrombin time 100 to 80 per cent of normal. Many of these patients had been under observation for from one to four years. None had, however, shown any evidence of vascular disturbances.

Group 2.—The ten patients in the second group had all had cerebral hemorrhages with hemiplegia and a number have since overcome the paralysis. Blood pressures varied from 150/90 to 228/120. The prothrombin time, taken from six to 18 hours after the hemorrhage occurred, varied from 40 to 70 per cent of normal.

Two patients with pressures of 180/100 and 190/110 were admitted to the medical service with definite hemiplegia, with loss of consciousness coming on shortly prior to admission. The prothrombin time was 100 per cent. The next morning both patients left the hospital, as there was no evidence of paralysis or hemorrhage. At last reports both were well.

Group 3.—The third group is composed of patients in whom a coronary thrombosis occurred between 24 and 36 hours before the prothrombins were determined. Each case was proved definitely to be a coronary from the physical laboratory and electrocardiographic findings. Prothrombins varied from 40 to 63 per cent of normal.

I do not believe that we can draw any definite conclusions until a greater number of patients have been investigated. However, the fact that all the patients in whom the prothrombin time was normal had no vascular insult, while those in whom the prothrombin time was 40 per cent or more than normal had some form of vascular disturbance, is significant.

It is also significant that those patients who were treated with some form of vitamin K and whose prothrombin time returned to normal limits, although their pressures were known to have exceeded the level at which the accident occurred, showed no evidences of hemorrhage. At present I am protecting all patients who show a prothrombin time greater than 30 seconds, or 80 per cent of normal, with some form of vitamin K.

Dr. W. de Gutierrez-Mahoney, Nashville, Tenn.—The last report is most significant, especially in so far as up to this time we have usually been concerned with the morbid pathology of these conditions, and without complete satisfaction. Although the early report by Forbus indicated that the media was the defective part in the cerebral vascular material, a recent paper by Glynn has shown that in ten patients who had aneurysms and fifteen control patients the incidence of defects of the media in each group was 80 per cent of the bifurcations examined. This observation has altered our previous views of etiologic relationship between these defects and aneurysms. But this study of vitamin K is probably going to give us a clue to the solution of some of these disturbances.

Our discussion has dealt principally with aneurysms, but we must also not lose sight of the problem that subarachnoid hemorrhage does arise without the association of aneurysm. I have seen a pathologic specimen in which there was a simple split in the whole vascular wall at one of the Y formations in the circle of Willis. Again, one must not always give up directly one thinks there is a subarachnoid hemorrhage from a ruptured vessel of this aneurysmal type, as in one case which I have seen recently, tumor was the source

of the trouble, although the clinical picture of spontaneous subarachnoid hemorrhage from aneurysm was the presenting diagnosis.

Dr. Beverley R. Tucker, Richmond, Va.—I wish to take just a moment to report a mistaken diagnosis in a negro women whose husband tapped her with a large lamp about the size of that pitcher. He hit her on the zygoma. This woman showed no signs of concussion and went around in domestic felicity for about ten days after the blow. She then became unconscious, with the symptoms of a subarachnoid hemorrhage, which was the diagnosis I made. The fluid, I might say, was bloody when the spinal tap was made, but I think that was due to puncture of a thecal vein.

She died, and at autopsy we found extensive thrombosis of the circle of Willis and no aneurysm, no hemorrhage.

Dr. Turner (*closing*).—Probably the best work on this subject from the standpoint of its pathology has been done by Hassin and appears in his latest edition.

The question of puncture is controversial. I favor puncture. The rupture soon becomes surrounded with heavy, fibrinous clots, and the possibility of increasing the hemorrhage by puncture is remote. Cysternal puncture is preferable to the lumbar route.

Lastly, I feel that we should think about aneurysms more than we do in chronic headache sufferers. I do not disagree, but I do not wholeheartedly agree with the idea that headaches should be considered as of neurologic origin. Many of them are conditions due to obscure aneurysm.

HEADACHES*

By PAUL MAHONEY, M.D.

and

J. S. AGAR, M.D.

Little Rock, Arkansas

As clinical men we are daily confronted with the problem of headaches, and this discussion will deal with this distressing condition from a purely clinical standpoint. Headache is a symptom with no local characteristic signature and it may be indicative of disease in any of a number of places.

It is needless to emphasize that we as otolaryngologists must emerge from our circumscribed sphere and regard the body as an integrated whole when we are called upon to solve the problem of headache.

For many years the laity lived under the false impression that the most frequent cause of headache was eye strain. In recent years, however, the role of sinusitis has taken the lead in the public mind. We have often made the statement that it has been our experience that about 90 per cent of all headaches have their origin in a disorder below the level of the shoulders. Spriggs studied the records of 4,796 consecutive patients and found that 500 (10 per cent) had this complaint as a major symptom, but in 3 per cent of the 500 patients in his study the symptom was apparently due to nasal disease. In fact, sinus disease is a relatively infrequent cause of chronic headache.

The subject itself is sufficiently confusing without our further complicating it by needless and arbitrary classification.

Much can be learned and many superfluous examinations avoided by observing the patient: his attitude, posture, facial expression, and mode of expressing his problem. The second greatest step toward a solution is a careful history, including the patient's age, occupation, and living habits.

The mode of onset of the headache, the duration of each attack, the location, the severity, the concomitant symptoms are all of great importance; for, as an example, we suspect that if the headache occurs in the morning it may be due to (1) frontal sinusitis, (2) brain tumors, (3) arthritis of the cervical spine, (4) cardiovascular disease; or if it is characterized by a rhythmical recurrence we suspect migraine and each cause of headache has certain features that give a clue to its identity.

In this paper we shall presume that the patient has had a careful general physical examination to eliminate organic diseases of the heart, kidneys, gastro-intestinal tract, and so on.

The symptoms of an acute attack in any of the sinuses are too characteristic to discuss before this group, although unless we carefully study the nose we may overlook an acute suppurative sphenoid sinusitis.

Recently we observed a young woman who had an acute cold and earache associated with severe pain in the vertex, radiating to the right occipital region and into the shoulder. Fever, nausea and vomiting accompanied her symptoms. A myringotomy was performed, which gave transient relief from the earache. After the patient became ambulatory she came to the office, where a careful examination was made. The sinuses were clear to transillumination and the intranasal examination was essentially negative. However, the fact that during a severe respiratory infection she developed the above men-

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tioned symptoms, the character and location of the pain made us suspect an acute sphenoidal sinusitis. Irrigation brought forth about 2 c. c. of pus. Recovery soon followed subsequent irrigations.

High deviations of the septum, by mechanically blocking the ostia of the sinuses, induce infection, and a submucous resection may become necessary to relieve the patient of recurring attacks of sinusitis.

There are repeated statements in the literature that large septal spurs touching the lateral nasal wall will produce headache. If the obstruction does not block the ostium we do not believe that any cases have been seen in our practice in which we have attributed the headache to this cause. Many patients will say they have relief from pain after operation, but it is only transient. If they are followed for a sufficient length of time the symptoms recur. Men working in large clinics have not the same opportunity of follow-up studies on their patients that private practitioners have who live in the same community and see their patients year after year.

It is extremely difficult to evaluate the role played by chronic sinusitis in headaches. Obviously if the infection has invaded the bone and an osteomyelitis supervenes pain will result. Dull pain between the eyes with vague statements of inability to concentrate and a complaint of postnasal drip may indicate chronic blockage of the ethmoid sinuses. Relief in this instance depends upon restoring the nose to as nearly anatomical perfection as possible which may necessitate a submucous resection, correction of any allergic factor, and restoration of good general physical condition.

Chronic infections of the frontal sinus usually cause unilateral pain at any time or all day, which is in contradistinction to acute frontal sinusitis which occurs in the morning, subsiding spontaneously around noon. This pain must be differentiated from supra-orbital neuralgia, the distinction being that in the latter the pain is more lancinating and distinct tenderness is elicited by palpating the nerve as it emerges from the supra-orbital foramen. X-ray is invaluable in this condition, for very little evidence is seen in nasal examination.

Many of the most persistent and baffling headaches are caused by a hyperplastic sphenoiditis, the diagnosis of which is based upon three important points: (1) vertex and occipital pain, (2) increased size of the blind spot, and (3) x-ray of the patient in the Granger position. Many patients with a chronic sphenoiditis complain only of dull generalized headaches and that their eyes tire easily. They usually possess and produce for inspection several pairs of spectacles which have been prescribed by ophthalmologists or optometrists, who either failed to question and examine the patient carefully or were unaware of the possibility of a chronic sphenoid sinusitis.

Except in the two instances above noted we have found with the passing years that in diagnosis of sinus infections we have successively depended less upon the x-ray and have concentrated upon the history and clinical evidence presented. It is a source of much wonderment and no little admiration that some are able to read an x-ray film and point out the exact one little anomalous or wayward ethmoid cell that is responsible for a whole clinical picture.

In our clinic the eye department is asked for assistance in helping to clarify some of the problems: complete refraction, fundus studies, visual fields, and eye muscle balance are carefully checked. However, the following quotation from recent writings of Gradle is significant:

> "Patients are apt to attribute a large percentage of headaches to eye strain, whereas headaches of real ocular origin are not frequent. In an analysis of some 12,000 consecutive eye patients it was found that 25 per cent gave the complaint of headaches. Of that number only 11.6 per cent presented ocular conditions that could account for the headache."[2]

The pain in trigeminal neuralgia is over the distribution of the branch involved and is an intense boring or acutely lancinating pain not concerned with sinus trouble.

It appears that the differential diagnosis between tic and acute sinusitis should be obvious, but there has been more nasal mutilation because of confusion in these diagnoses than for any other cause except possibly allergy. In addition, many good teeth have been sacrificed on the altar of tic doloreux which deserves nothing but condemnation.

Injection of procaine hydrochloride into the involved branch will usually cause a cessation of symptoms and thus confirm the provisional diagnosis, although cure is rarely effected until the neurosurgeon is called in to do a sensory root section.

In all discussions of headaches one encounters elaborate descriptions of sphenopalatine neuralgia, the so-called lower half headache. In only one case out of approximately 75,000 persons seen in our clinic in the last fifteen years has an

alcohol injection of the sphenopalatine ganglion been effective. The status of these conditions is admirably stated by Woltman:

"Such terms as sphenopalatine neuralgia, great superficial petrosal neuralgia, and vidian neuralgia remain confusing to all but those who know what is meant by 'typical.'"[3]

The literature abounds in descriptions and discussions of migraine, so much so that the obvious case which runs the gamut of aura, unilateral severe headache, nausea, vomiting, and sleep is well known. The atypical cases due to changes in the tonus of the cerebral vessels from whatever cause will present great difficulties in diagnosis. Allergic studies and restoration of perfect general health are essential not only for the diagnosis, but the treatment of the condition.

There are many cases in which the headache is definitely related to the menstrual cycle appearing a few days prior to the onset. These headaches usually are frontal and disappear with the onset of menstruation. These patients seldom complain of cramping with menstruation and those with cramping seldom complain of headache. Some assert that these headaches are migrainous in type; others believe their etiologic basis is endocrine.

In conducting an office practice with patients in the middle and upper income brackets one is apt to neglect to take into consideration syphilis as a cause of intense recurring headaches. Neuro-recurrences in inadequately treated lues, luetic meningitis, late meningovascular lues, or cerebral endarteritis are many times first manifested by intense stupefying headaches. Naturally blood Wassermann, Kahn, and lumbar punctures are indicated to confirm or discredit such a diagnosis.

Costen a few years ago described a syndrome which is due to faulty occlusion of the teeth with erosion of the glenoid fossa by the mandible. Many bizarre symptoms result. In an older person with ill-fitting plates or in edentulous individuals this syndrome should be thoroughly investigated and if detected the patient should be referred to a dentist familiar with handling these cases.

No examination is complete until thorough inspection and perhaps x-ray studies are made of the teeth. Impacted third molars, apical abscesses and retained roots can cause severe unilateral or vertex headaches. These pains are variable in intensity, but usually are present throughout the day every day. One should not be lulled into a false sense of security by the patient's statement that all his teeth have been pulled, for we have seen many cases in which retained roots or supernumerary teeth have been the offending etiologic factor.

Up to this point we have discussed problems based upon actual pathologic factors, but unfortunately a distressingly large percentage of headache cases fall under the classification of psychogenic headaches. These represent an escape from reality and treatment must be purely conversational. The greatest injustice that can be done to this type of individual is to institute treatment.

Headaches incidental to anxiety states come on after the patient has been subjected to a greater or lesser emotional disturbance. As one example we have a young woman whose headaches are so severe as to require narcotics and the only precipitating fact is her husband's sporadic attacks of inebriety.

There are numerous deep-seated psychic causes of headaches that we in our specialty may never be able to unearth. Many patients have had extensive nasal, abdominal and pelvic surgery when the cause actually was hidden in their mind. These patients should not be ridiculed and briskly dismissed as unpleasant necessities in our practice, but should be encouraged to consult a competent psychiatrist, for many times they will be able to uncover the cause of the anxiety state.

Occupational headaches are becoming of increasing importance. Strained positions maintained for long periods, exposure to chemical fumes, long hours of working in the hot sun with insufficient rest and fluids, all may be the sole cause of the patient's disability.

In all the foregoing group of headaches not based upon any perceptible physiologic derangement the most important fact is recognition. The patient should be acquainted with his situation and above all things mechanical, chemical and surgical measures should be absolutely denied.

There are many other causes of headaches, but the scope of this paper will not allow the differential diagnosis of such fairly common conditions as brain tumors or other intracranial lesions. These we assume are always suspected and are duly investigated by a neurologist if focal signs or earlier symptoms are present.

A headache should always be considered of serious import and all means at our disposal should be directed at ascertaining the exact cause, for headache is a symptom and not a disease

entity, and we should beware of dispensing an analgesic and hoping for the best.

Wilbur and French have presented an outline for diagnosis of headaches which we think is excellent and we shall include it by way of summary.

(1) History.
(2) Physical examination.
  (a) Head injuries, nodules, and tumors.
  (b) Ocular fundi.
  (c) Blood pressure.
  (d) Neurotic manifestations.
  (e) Organic diseases that lead to headaches.
(3) Neurologic examination.
(4) Eye examination.
  (a) Refraction.
  (b) Changes in tension, etc.
(5) Examination of ears, nose, and throat.
  (a) Accessory sinus disease.
  (b) Tumors.
  (c) Mastoid infections, etc.
(6) Examination of teeth.
  (a) Search for impacted or abscessed teeth.
  (b) Temperomandibular joint.
(7) Allergic survey.
(8) Laboratory examination.
  (a) Blood.
  (b) Urine.
  (c) Wassermann.
  (d) Lumbar puncture.
(9) X-ray.
  (a) Head.
  (b) Cervical spine.
(10 Encephalogram, ventriculogram.
(11) Therapeutic tests.
  (a) Glasses.
  (b) Nasal treatment.
  (c) Psychotherapy.
  (d) Ergotamin.

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DISCUSSION (*Abstract*)

Dr. Harvey B. Searcy, Tuscaloosa, Ala.—I do not think any paper on headache is complete unless malaria is stressed. I believe 75 per cent of all supra-orbital neuralgia in Alabama is due to malaria. In 1917 I printed a paper on a series of supra-orbital neuralgias, some complicated by sinus, and some with no pathologic condition in the nose, in which all showed malarial parasites, and quinine relieved them in four to five days.

Dr. T. S. Burgess, Atlanta, Ga.—The essayist mentioned the possibility of trigeminal neuralgias with his headaches, and I wonder if he has had any experience in having the patient sniff trichlorethane as a therapeutic test to rule out this type of headache. I recently had a question of whether a man had a trigeminal neuralgia or sinus headache, in which that gave relief.

Another point I would like discussion upon is the so-called hyperplastic ethmoid and sphenoid sinuses. I see few cases in which I cannot find slight abnormalities with x-ray help, or with the aid of a nasopharyngoscope see some change about the posterior ends of the turbinates or septum. I should like to know if Dr. Agar thinks these patients should be operated upon in the absence of other findings.

Dr. Agar (closing).—In cases of trigeminal neuralgia we have used trichlorethylene and have seen favorable results in a few cases; however, beneficial results are unpredictable and recurrence is the rule. Alcohol injections, likewise, are satisfactory in very few cases. If it is at all possible the patient should be referred to the neurosurgeon for sensory root section.

In cases of hyperplastic sphenoids, we have seen many where a thorough nasal study has given negative results. In these cases one finds an enlarged blind spot. We, therefore, feel that when a patient presents the picture of vertex headaches, enlargement of the blind spot, and some thickening of the sphenoid line in the roentgenogram one is justified in making a small vertical opening in the anterior wall of the sphenoid sinuses.

Malaria has been suggested as a cause of headache and this is of particular importance to note, especially since we practice in the South. Thorough blood studies are desirable and necessary in a complete work-up.

SYMPATHETIC OPHTHALMIA*

SOME REMARKS CONCERNING ITS ETIOLOGY, DIAGNOSIS AND TREATMENT, WITH CASE REPORTS

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In 1930 the author[1] reported a series of seven cases of sympathetic ophthalmia before this Section which had been observed in military and civil practice in which the immunologic properties of uveal pigment had been investigated. Since that time five additional cases have been observed. These cases have also been investigated from the standpoint of uveal pigment hypersensitiveness. The observations have substantiated the findings of Elschnig, Woods and Knapp in regard to uveal pigment hypersensitiveness, but we believe that there are other equally important factors to be considered in sympathetic ophthalmia, both from the standpoint of cause and treatment.

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The mechanism of production of sympathetic ophthalmia has been the subject of much controversial discussion. The theory that uveal pigment plays an important part in the course of the disease seems to be logical and has been substantiated clinically in the cases we have investigated.

Uveal pigment sensitization with the production of hypersensitiveness to this substance does not seem to be the complete explanation of the pathologic phenomenon designated as sympathetic ophthalmia, although there is an allergic phase in the course of sympathetic ophthalmia without doubt. In investigating the immunologic properties of uveal pigment we have verified the fact that there are other pathologic conditions affecting the eye in which hypersensitiveness to uveal pigment exists, such as pigmentary degeneration of the retina and a form of posterior uveitis which is probably due to focal infection.

Briefly, the condition which we designate as sympathetic ophthalmia or sympathetic uveitis is characteristically an inflammatory condition affecting chiefly the vascular tunic of the eyeball, which ordinarily follows a perforating injury. Subsequently, at intervals of from ten days to several years, there follows a like inflammatory reaction in the other eye. In the delayed or late reactions a second trauma to the exciting eye is not unusual. The characteristic microscopic picture shows lymphocytic infiltration in the uveal tract which tends to assume a nodular form in association with endothelioid and giant cells, and more or less disintegration of the choroidal pigment. The condition may occur without a perforating wound and has been observed in conjunction with intraocular melanotic sarcomata and subconjunctival scleral rupture. There are instances of undoubted sympathetic ophthalmia in which giant cells are not found in the greatly thickened uveal tract. The coulettes discarded prior to imbedding the chief portion of the pathologic specimen may contain the giant cells or they may occur chiefly in the region about the vortex veins, which should always be examined in doubtful cases lest the characteristic cellular pathology be missed.

In certain cases of uveitus due to focal infection the severity of the uveal reaction is so great that the picture of sympathetic ophthalmia is strongly suggested. These findings suggest that there is little if any essential pathologic difference in uveitis due to focal infection exhibiting uveal pigment hypersensitiveness, and sympathetic uveitis, except that of degree of pathologic change, and the fact that there is usually, though not always, some type of traumatism associated with sympathetic uveitis. The reaction in sympathetic uveitis as well as in the focal infection type may be mild and easily controlled or fulminating and cyclonic in its course, resisting all therapy.

The difference in the mechanism of production in the two types is probably that a more rapid disintegration of uveal pigment takes place in injured eyes due to the occurrence of a greater number of leukocytes in the wound reaction which act upon uveal pigment through their enzymes, converting the insoluble protein into a soluble substance which is absorbed and acts as an antigen, producing sensitization to this specific type of pigment. The choroidal pigment is of the granule type, being lodged in cells called melanophores. It occurs in similar form in other parts of the body, such as the central nervous system and in the internal ear. It should not be confused with the lipofuchsin type of pigment, which also occurs in the eye. The latter apparently does not share in the allergic phase of sympathetic ophthalmia. Regardless of where melanin occurs in the body, a reaction will occur at that point once the organism is sensitized to this substance. The opposing or sympathizing eye, being rich in the same type of pigment, undergoes an allergic type of inflammatory change, in which one would not expect to find bacterial evidence of disease.

Uhlenhuth[2] and others have demonstrated that uveal pigment in its immunologic reactions is organ specific, but not species specific. Kodama[3] believes that ocular tissues possess more than one antigen.

The intracutaneous test to determine uveal pigment hypersensitiveness is performed by injecting approximately 0.25 c. c. of normal tricresol-free uveal pigment suspension intradermally and observing the reaction at the point of injection at intervals for twenty-four hours. A control injection is made with 1/20 dilution of beef serum. Where formerly we used several dilutions of uveal pigment to determine quantitatively the degree of hypersensitiveness present, from a practical standpoint a single injection of normal pigment suspension is sufficient. The so-called normal pigment is a suspension of uveal pigment in normal saline solution. The choroidal pigment from one beef eye is suspended in 7.5 c. c. of normal saline solution and in the therapeutic solution is preserved by the addition of 0.5 per cent tricresol. The skin testing solution is free from preservatives and great

care is necessary in its preparation to insure absolute sterility.

In reference to therapy of sympathetic ophthalmia our experience has been that uveal pigment suspension injected hypodermically is the most valuable single therapeutic agent at our disposal. Recovery from sympathetic ophthalmia depends upon raising the uveal pigment antibody content of the blood serum by injections of uveal pigment suspension or by absorption of enough pigment from the eyes to obtain an immunologic balance. The normal reaction of the body is to develop an immunity to the pigment which prevents its further absorption. Failure to develop immunity is accompanied by a persistence of the inflammatory reaction in the eye and susceptibility to sympathetic ophthalmia. In the first few days following an eye injury the intradermal pigment test will be negative, which means that there is no immunity to uveal pigment, and the individual is considered susceptible to the development of sympathetic ophthalmia. From a practical standpoint, relatively few patients with eye injuries develop sympathetic ophthalmia. With the absorption of uveal pigment from the eye the patient becomes sensitized to this substance and the skin test becomes positive. At this point conditions are favorable for the sympathetic type of uveal inflammation to develop in the opposing eye. If enough pigment is rapidly absorbed a certain degree of immunity may be developed, and only a mild sympathetic ophthalmia occurs. Usually, however, other measures are necessary to whip up the cells to greater antibody formation before immunity to pigment develops, and for this purpose uveal pigment suspension injected hypodermically would, because of its selective and specific properties, appear to be the most desirable agent at our disposal. If the patient immunizes himself by absorbing his own pigment, it is usually a lengthy process, and the reaction in the eyes subsides so slowly that great damage occurs.

Tuberculin is of great service as a supplemental agent in the treatment of sympathetic uveitis and apparently acts as a nonspecific antigen to supply additional powerful stimulation to the cells and thus increase uveal pigment antibody formation.

The slowness of absorption of uveal pigment is probably responsible for the delayed response to the injections in some instances. It has been observed that intracutaneous administration of pigment gives much prompter response than intramuscular injection and is the preferable method, but when larger doses are administered the technical difficulties increase, as does the discomfort which they cause. The pigmented areas in the skin which often remain for a considerable time, but eventually disappear, are likewise objectionable.

An understanding of what is meant by an Arthus phenomenon is essential to proper understanding of what takes place in certain phases of sympathetic ophthalmia (as well as certain cases of posterior uveitis due to focal infection). In the briefest terms, it may be defined as a reaction in a previously sensitized structure following the second administration or absorption of the original type of antigen responsible for the sensitization. When a bacterial toxin acts as the antigen, the origin from a strain of organisms closely related to the original sensitizing strain is apparently all that is necessary.

The question naturally arises as to why one individual with a perforating eye injury should develop a uveal pigment hypersensitiveness and another with an apparently similar wound escape it. The answer to this perplexing problem may be in part explainable on the same basis as in other hypersensitive states. In general, it may be said that cellular hypersensitiveness may be inherited in varying degrees from slight to marked and the degree of reactive capacity of the cells to a specific antigen predestined in this manner. In another group of individuals susceptibility to the hypersensitive state may be brought about by alterations in the body chemistry such as an over-alkaline body state, or excess of alkaline ash products in the body, which apparently renders the body cells more easily sensitized by the action of a specific antigen. This statement seems to be justified on the basis of experimental and clinical investigations into the subject of allergy in general and also in the investigation of the type of posterior uveitis due to focal infection. This latter condition exhibits many analogies to sympathetic uveitis, and because of their greater number, they afford a larger field for study. In referring to an over-alkaline body state it is not intended that the idea of an actual alkalosis be conveyed, but that the hydrogen ion concentration of the blood serum and other body fluids as expressed by the pH is on the high normal side. We have considered this due to an excess of the basic type of buffer salts in the blood serum or a deficiency of the acid ones. At the present time there is no satisfactory clinical test which can be routinely applied to determine this point accurately and quickly. Most of our present day knowl-

edge in this direction is based upon the reported findings of experimental physiologists. Further research is urgently needed in this direction and it is hoped that these remarks may stimulate further investigation of this phase of the hypersensitive state. There are undoubtedly other factors which enter into and influence this equation, but just what they are is impossible to state at this time. Verhoeff[4] has called attention to the fact that tetanus antitoxin apparently exerts a protective influence against the development of sympathetic ophthalmia which may be explained as due to colloid action on the cell wall, preventing antigenic substances from penetrating it and stimulating the cell protoplasm to elaborate further antibodies for an indeterminate period of time.

Other measures of value in the treatment of sympathetic ophthalmia have been the administration of specific and nonspecific cell stimulants. These substances have for the most part been protein-like bodies, or substances derived from proteins, or toxins such as those found in typhoid vaccine. They may be administered at the time an injury is first treated or, in operative cases, immediately after the operation prophylactically, with the view to raising the patient's immunity to its highest degree at the time when it will be needed most.

So long as a state of equilibrium exists between the patient's immunologic reactions and invading organisms, recovery from traumatism takes place normally. As far as control of wound infection is concerned, regardless of the part of the body involved, we can attack the problem of healing only by attention to one or both of the two components of this phenomenon: either by raising the patient's immunity or by rendering the invading bacteria less virulent. The same may be said in allergic reactions where it is the question of balance between the reactive capacity of the cells on one hand and the degree of stimulus applied to them by an antigen or allergin on the other. If accompanied by febrile reaction, the protection is greater because of the increased cellular immunity accompanying it.

The antigenic titer of the blood may be increased by the administration of nonspecific substances such as those enumerated above. There has been an interesting experiment[5] made in studying immunity to typhoid infection which shows how this may be accomplished. When typhoid toxin or vaccine is administered to an individual, specific agglutinins appear in the blood serum which constitutes the basis for the well-known Widal reaction. The concentration of these agglutinins apparently runs exactly parallel with the degree of immunity against typhoid infection. At first the titer is high, but as time passes it decreases, so that fewer agglutinins are present in the blood stream and immunity to typhoid infection likewise becomes less. However, if the immunized individual is given an injection of a nonspecific protein, or an unrelated bacterial toxin, or if he has a febrile reaction from any cause, the agglutinin titer rises to a point almost as high as it was originally, but later drops again, unless the stimulant is reapplied to the cells in the form of another dose of antigen. This experimental evidence is cited to explain why supplemental therapeutic agents are used in the treatment of sympathetic ophthalmia and how they can be of value as adjuncts to uveal pigment antigen in treatment by applying additional or supplemental stimulation to the cells and increasing antibody formation. Response to uveal pigment therapy appears to be best in young subjects and most gratifying results are obtained in the early cases.

All eye wounds should receive tetanus antitoxin.

Theoretically, uveal pigment should be of value prophylactically, but we have had no experience with it in this respect.

In addition to other protective measures we have attempted within recent months to obtain added safety for the patient by administering small doses of sulfanilamide when possible to do so, 20 grains daily, for two days prior to, and four or five days after any intraocular operation. With accidental wounds this has been possible only in the post-traumatic stage. Methylthionine hydrochloride in a 2-grain dose is administered with sulfanilamide once every twenty-four hours. Inasmuch as the protection afforded by sulfanilamide is a chemotherapeutic one rather than an immunologic one, it should be borne in mind that it endures only as long as the drug is present in the body. It has been too short a time to warrant a definite expression of opinion concerning its effectiveness other than to say that it apparently acts favorably.

Calcium is also of great service in the treatment of sympathetic ophthalmia, as its use limits the permeability of cell membranes and therefore lessens edema and exudation in the choroid. It may be administered by mouth or intravenously in any one of several forms.

Parathyroid extract hypodermically is recommended in conjunction with the administration of calcium. The usual dose is 0.5 c. c. once daily.

Its use is based empirically on its action in decreasing the permeability of cell membranes when used in conjunction with calcium.

Autohemotherapy is quite often of service and in the hands of certain investigators has been reported to be especially valuable in the treatment of sympathetic ophthalmia. The method consists of removing from 2 to 5 c. c. of whole blood from a vein of the patient and immediately reinjecting it intramuscularly. Daily administration is advisable. Its action is explained on th basis of a colloidoclysis or splitting of the colloids when blood escapes from the vascular system, these split products acting as foreign protein when reinjected.

The time-honored sodium salicylate has been used in all our cases empirically at one time or another in the course of the disease. Rectal administration has been the method of choice, as the patient may be quickly saturated by giving 40 grains at a dose by rectum three times daily.

Tuberculin has been the drug of choice for its foreign protein effect, and it has been given first place over typhoid vaccine, milk injections and other protein or split protein products in our practice. It is used in gradually ascending doses and injected daily, beginning with 1/100,000 dilution 0.1 c. c., increasing by 0.1 c. c. daily. If the patient is tuberculous, for obvious reasons it is best to substitute some other foreign protein for the tuberculin. Intracutaneous administration is preferable and old tuberculin has been the one of choice.

Staphylococcus bacteriophage has been used in some of our cases, but we do not feel that any spectacular effect has been observed other than the benefit that would come from any other foreign protein.

Local treatment to the eye is to be carried out along the usual well recognized lines.

Eradication of focal infections, or minimizing their effects when they cannot be completely eradicated, is urgently indicated early in the course of sympathetic ophthalmia, and when a focus is in any degree questionable there should be no hesitancy to include it in the campaign of eradication. There is some difference of opinion among ophthalmologists on the importance of focal infections in uveal inflammations, but with apologies to those who hold an opposite view, it can be said that the experience gained in our limited series of cases has substantially demonstrated the soundness of this belief.

Eyes that have been the seat of a sympathetic uveitis do not tolerate surgery well and operative procedures on such eyes should be carried out only with the full realization of the reaction which may follow.

It is urged that all excised eyes should be preserved for microscopic examination to facilitate and render more exact the investigations which may follow in any case and for microscopic confirmation of the clinical diagnosis which in sympathetic ophthalmia must always be considered a presumptive one unless substantiated by other findings.

In closing I wish to express gratitude to my colleagues who have made this investigation possible by referring the patients for investigation and the unlimited cooperation extended by them. While the series reported comprises relatively few cases and therefore conclusions must necessarily be cautiously drawn, the statements made in this paper appear to be justified in a definite degree.

SUMMARY

(1) Sympathetic ophthalmia is a disease somewhat similar in character, but more violent than certain other types of uveitis. This analogy is most apparent in uveitis due to focal infection in which the similarity extends to the sensitization phenomena.

(2) There is an allergic phase in the course of sympathetic ophthalmia based on hypersensitiveness to uveal pigment, but acting coincidentally with, or in advance of, the pigment sensitization, there is a reaction due to bacterial toxins similar to an Arthus phenomenon which is believed to play an important role in the course of the disease. Its persistence may be responsible for a continuance of symptoms after the patient has been rendered immune to uveal pigment.

(3) The state of the patient's body chemistry may determine in a large degree the susceptibility to sympathetic ophthalmia.

(4) The hypersensitive state may be influenced by a number of therapeutic measures.

(5) The severity of the disease and its destructive effects are influenced by several factors. They are: the prompt diagnosis of the condition and the immediate application of remedial measures designed to normalize the balance that exists between the reactive capacity of the patient's body cells and the stimulus applied to them by the exciting antigen.

(6) Uveal pigment is a valuable addition to our therapeutic armamentarium in sympathetic

ophthalmia, but other methods of treatment are not to be abandoned in favor of its exclusive use.

(7) Enucleation of the exciting eye is ordinarily not advisable once sympathetic ophthalmia is established as the exciting eye may become the best eye when the storm has passed.

(8) Surgical measures are not well tolerated by eyes that have been the seat of sympathetic ophthalmia, either sympathizing or exciting.

Cases one to seven, inclusive, have been reported in detail in an article published in 1930 in the SOUTHERN MEDICAL JOURNAL,[1] to which the reader is referred. Only supplemental information concerning these cases is included in this article.

Case 1.—R. J. Mc., a white man, aged 36 years, was first examined June 16, 1928. Efforts to trace him since his last visit have been unsuccessful. The final recorded vision was O. D. 5/200 with an associated retinal detachment. O. S. was enucleated. The diagnosis was confirmed by microscopic examination of the excised eye. The period of observation was two months.

Case 2.—H. R., a white girl, aged 15 years, was first examined August 16, 1928. The final vision reported in October, 1930, was O. D. 20/20, O. S. 20/40-3. The subsequent clinical course of the sympathetic uveitis showed numerous recurrences of inflammation in the exciting (left) eye, and the development of a lenticular cataract which was needled and extracted in May, 1931. The postoperative course was unsatisfactory with recurrent inflammation in the eye, which eventually necessitated enucleation February 4, 1932. Uveal pigment controlled each recurrent attack of inflammation in the right eye. Since the onset of the ocular trouble the left maxillary and left ethmoidal sinuses have been operated upon and the tonsils removed. In 1934, she was married and later she gave birth to a male child, who is now 4 years old. The child has been carefully examined for ocular defects, as it was thought the hypersensitive state in the mother might have some effect on the development of the child's eyes, but they appear normal in all respects. The vision in the sympathizing right eye remains 20/20 in spite of the several attacks of recurrent inflammation in this eye. Microscopic diagnosis of the excised eye was sympathogenic uveitis. It is believed that the absorption of lens protein following the needling operation on the exciting eye may have liberated a second antigen which was responsible for the loss of this eye. The period of observation in this case has been eleven years. Present vision, February, 1939, is O. D. 20/20.

Case 3.—In the case of C. E. H., a man, aged 62 years, the result attained was subsidence of the recurrent pain and inflammation in the wounded eyes. There was never any thought of restoring vision in this patient. His final vision was O. D., P. L. and O. S. blind. There have been no recurrences in inflammation since pigment therapy. The period of observation is thirteen years.

Case 4.—T. C. O., a boy, aged 6 years, was seen in September, 1927, with the diagnosis of post-traumatic sympathetic uveitis. He was treated with uveal pigment. Initial vision was O. D. 2/200 and O. S. enucleated. Recent reports indicate that vision is now better than the 20/200 reported as final vision in 1930, as he now drives his own automobile.

Case 5.—W. D. S. was a white man, aged 52 years. His initial vision was O. D. 6/200, O. S. enucleated. Uveal pigment therapy was administered with final vision of 20/200. Retinal detachment precluded further improvement.

Case 6.—H. E., a white woman, aged 47 years, was seen in consultation August 27, 1928. Her initial vision was O. D. enucleated, O. S. fingers at 18 inches. Uveal pigment therapy was employed. Final vision 10/100, subsequently dropped to P. L. The violence of reaction in this case with the formation of plastic exudation in abundance, associated with the advent of secondary glaucoma, made the outlook in this case unfavorable from the beginning.

Case 7.—C. R., a man, aged 37 years, had an initial vision P. L., O. S. 10/100. Uveal pigment therapy was administered. Final vision was O. D. 1/50, O. S. 10/40.

Additional cases have been more recently observed.

Case 8.—C. A., a Mexican, aged 36 years, fell and broke his glasses, receiving an incised wound of the cornea and limbal region of the left eye October 28, 1937. Twelve hours later, a conjunctival plastic operation was performed, which healed satisfactorily. The injured eye continued to show some slight redness and pain. On the twenty-eighth day following his injury the vision in the right eye was impaired. Intensive treatment with sodium salicylate and hot packs was begun. Tetanus antitoxin was not administered. The vision in the right eye became progressively worse and the inflammatory reaction increased in severity until at the end of twelve days he could only distinguish light with the right eye and nothing with the left. He was first seen in San Antonio December 13, 1937, on the forty-sixth day following his injury, at which time he was complaining of inability to see with either eye, and severe pain in the right eye and supraorbital region, which was worse at night. The left eye was only slightly painful. Subjective light flashes were occurring frequently. Examination revealed the following: vision O. D. was light perception, with localization in only the temporal and superior fields; O. D. was blind. Both eyes were sensitive to palpation. Examination of the right eye revealed an abnormally deep anterior chamber. The cornea was cloudy and on its posterior surface were numerous punctate deposits grouped chiefly in its inferior area. The iris was swollen and numerous dilated vessels were seen in the stroma which gave it a reddish cast. Near the base of the iris inferiorly were three small folds or reduplications in the iris, which were considered as being due to foci of cellular infiltration. The pupil was irregular and did not respond to light stimulation.

The left eye showed no light perception. There was a transverse healed wound across the cornea which extended into the limbal region at its temporal aspect. The cornea of this eye was cloudy and the posterior surface was covered with punctate deposits. The anterior chamber was approximately normal in depth. The pupillary area was obstructed with exudate and there was no reaction to light stimulus. There was a large

operative coloboma in the inferior temporal quadrant. The iris was not adherent to the posterior surface of the cornea at any point, nor was it incarcerated in the healed wound. Tension was subnormal and did not register on the tonometer in either eye.

Laboratory findings were: Wassermann and Kahn tests negative, red blood count 5,010,000, hemoglobin 90, and white corpuscles 6,500. Polymorphonuclear leukocytes were 56 per cent, divided as follows: segmented forms 49, stabs 6 per cent, eosinophils 1 per cent, lymphocytes 38 per cent, myelocytes 1 per cent, monocytes 5 per cent, and sedimentation rate was 8 mm. per hour. The urine was negative and blood pressure 126/80. Audiograms showed marked loss of hearing for the high notes (2048, 4096 and 8192). The uveal pigment test (intracutaneous) was one plus in twenty-four hours. The tuberculin test was negative in forty-eight hours to 0.3 c. c. 1/100,000 O. T. It was repeated with a stronger dilution (0.1 c. c. 1/1000 O. T.), which gave a negative skin test in an additional forty-eight hours. Dental x-rays showed an advanced pyorrhea. The tonsils were moderate sized, but no pus was expressed from them. The sinuses were negative clinically and from the x-ray standpoint.

Uveal pigment therapy was instituted and in addition he was given sodium salicylate grains 40 in four ounces of water by rectum three times daily. Ten teeth were extracted which showed abscesses. The initial dose was 0.25 c. c. of the normal suspension and this was increased 0.25 c. c. daily until 2 c. c. were reached, at which level the dosage was continued. After the second pigment injection the patient could see a point of light at five feet with the right eye, but could not accurately localize it. On the third day of pigment therapy the cellular deposits on the cornea and anterior lens capsule of the right eye began to clear away. The left eye showed a similar change, but no increase in light perception and both eyes were less red. A very faint fundus reflex was obtainable in the right eye on this day. Both eyes were still sensitive to palpation and the tension remained on the minus side. On the fourth day the sodium salicylate was reduced to 80 grains daily because of tinnitus aurium. Whole blood (patient's) 3 c. c. was injected intramuscularly. On the following day (fourth) further improvement was noted. On the fifth day a greenish reflex was visible inferiorly in the anterior portion of the vitreous which was suggestive of a retinal detachment. The condition of the left eye did not change. During the following days, up to the seventh, progress was slow. There was enough clearing of the exudate in the right eye to reveal numerous heavy sheets of vitreous exudate. On the seventh day tension in the right eye was scleral 4, corneal 5 with Bailliart's tonometer. The left globe remained hypotonic. On this date, 0.2 c. c. 1/100,000 O. T. was administered.

On the ninth day tension was scleral 8, corneal 10 (Bailliart's). The left globe was hypotonic. The exudate had practically cleared from the cornea and anterior lens capsule. Synechiae were present between the iris and anterior lens capsule were now evident. At this point one could see about half way back into the vitreous with the ophthalmoscope. The vascular engorgement had entirely cleared in the right eye, and the left also showed an appreciable improvement. On the eleventh day vision in the right eye was fingers at two feet in the inferior field only. The left eye showed no improvement. Tension had risen in the right eye, scleral 15, corneal 7 (Bailliart's). On the twelfth day subjective light flashes troubled the patient considerably. Vision in the right eye was fingers at two feet in both inferior and temporal fields. Tension in the right eye was scleral 15, corneal 14 (Bailliart's). The tension continued to drop and remained low until the twenty-second day, when it rose to scleral 10, corneal 8, but during this interval from the thirteenth to the twenty-second day vision had improved to 3/200. On the thirty-second day his vision was O. D. 5/200, O. S. nil. On this date the patient had an attack of acute follicular tonsillitis. The nerve head in the right eye was faintly visible by indirect ophthalmoscopy. Its margins appeared blurred and exudate partially concealed the retinal vessels about the nerve head. Three teeth were extracted. On the thirty-fifth day vision in the right eye was 6/200, scleral tension 17, corneal 18 (B). The left eye remained hypotonic and blind. Seven additional teeth were extracted. On the forty-first day vision was O. D. 10/200, and on the forty-fifth O. D. 10/100, at which time the patient could distinguish colors of green and blue. On the forty-eighth day vision was 10/50 right, and the left eye for the first time showed light perception. Improvement continued and on the fifty-first day vision was 10/10 in the right eye, the macula region was visible and appeared slightly pigmented. On the sixty-eighth day vision in the right eye was 10/20, left eye light perception, tension varied from 18 scleral and corneal to 22 scleral and corneal in this interval. On the seventy-eighth day vision was O. D. 10/20, O. S. 2/200 w. g. +0.75 sph. 10/15. The tonsils were removed under local anesthesia. On the one-hundredth day of his illness both eyes appeared to be quiescent and atropine and dionin were discontinued. He remained on pigment 2 c. c. daily and old tuberculin 1/100 dilution 1 c. c. twice weekly. On the one hundredth and seventh day his vision was O. D. 10/15, O. S. 10/200 w. g., O. D. —0.25 —.25 x 180 20/20; O. S. 10/200 not correctable. Tension was: O. D. scleral 20, corneal 18; O. S. scleral 17, corneal 16 (Bailliart's).

Normal vision has continued in the right eye while that in the left has dropped back to P. L., due to cataractous changes in the lens. The color vision was normal. A total of 206 c. c. of uveal pigment suspension was used in this case. Old tuberculin was used throughout in addition to pigment. The history, course, hypersensitiveness to uveal pigment and response to pigment therapy seem to justify the diagnosis of posttraumatic sympathetic uveitis in this instance. The result was classified as satisfactory. The period of observation was twenty-one months. Microscopic confirmation was not obtained.

Case 9.—W. T. McE., a white man, aged 53 years, was referred through the courtesy of Dr. Sam Key, of Austin, Texas, February 23, 1938, with the following history. At the age of 11 years he was struck in the right eye with a stick of wood and subsequently developed a traumatic cataract in the injured eye. In July, 1914, following a blow on the head, a retinal detachment occurred in the left eye. At this time the right eye was operated upon and vision restored in it. Practically normal vision was obtained. In January, 1936, the patient was struck in the left eye in a fight. A severe injury to the eyeball was sustained, and subsequently the eye shrunk to about one-half its former size. In 1937 the patient had an attack of anemia, the cause of which was undetermined, and was ill for five or six months, receiving several transfusions during the illness. The phthisical left eye received a second

injury by being bumped against the handle of a wheelbarrow. Some three or four weeks prior to his admission vision began to fail in the right eye. He consulted an oculist, who referred him for investigation with reference to uveal pigment hypersensitiveness as the condition was considered due to sympathetic uveitis. Examination February 23, 1938, revealed an acutely inflamed right eye, showing marked circumcorneal and episcleral vascular engorgement. The anterior chamber was deep, the cornea cloudy with a heavy punctate deposit on its posterior surface. The eye was aphakic and no fundus reflex was obtained. The iris was swollen and the vessels in the stroma were intensely engorged. The left phthisical eye was diffusely reddened, the cornea opaque and both eyes were sensitive to palpation. Vision in the right eye was fingers at one foot. The right eye was intensely photophobic. The patient was hospitalized and placed on sodium salicylate grains 40 by rectum three times a day.

Wassermann and Kahn were negative. The tuberculin test was negative in forty-eight hours. The uveal pigment test was four plus in five hours. The red blood count was 4,000,000, hemoglobin 88 per cent, white blood corpuscles were 5,000, lymphocytes 30 per cent, monocytes 7 per cent, and polymorphonuclear leukocytes 63 per cent, divided as follows: segmented forms 59 per cent, stab cells 4 per cent. The urine was negative. Blood sugar (fasting) was 100 mg. per 100 c. c. X-ray showed four questionable teeth, which were removed under local anesthesia on his second day in the hospital.

Uveal pigment therapy was started with the usual initial dose of 0.25 c. c. On the fourth hospital day his vision had cleared to 10/100 with glasses. On his sixth day in the hospital he developed an acute delirium, which necessitated discontinuance of sodium salicylate and atropine to the eye. Two days later (eighth day) the delirium had subsided and the atropine was resumed. The right eye became less engorged and the photophobia improved. On the fourteenth day vision was O. D. 10/100 unaided and 10/40-2 with correcting lens. On the fifteenth day the right eye showed an almost complete subsidence of circumcorneal injection, but was still quite sensitive to palpation. Fundus details were now visible with sufficient clarity to show numerous opacities present in the abnormally fluid vitreous. The tension at this stage was O. D., scleral 18, corneal 15, O. S. hypotonic. On the seventeenth day the vision was 10/30-3 with glasses and on the twentieth day 10/100 unaided and 10/20-1 with glasses. Only faint circumcorneal injection remained. The globe was still slightly sensitive to palpation, but no longer photophobic. On the twenty-second day the left eye was enucleated under local anesthesia and recovery was normal. On the twenty-ninth day vision was 10/100, w. g. 10/15 (+4.50 sph. with +2.00 add J. 37-13 inches). Treatment with uveal pigment was given daily throughout the time he was under treatment in conjunction with Old Tuberculin. On the fifty-sixth day vision was 10/100 w. g., 20/20—6, at which level it continued until his discharge from treatment on the eighty-second day.

Before and during this patient's illness he showed definite signs of mental disturbance, which increased in severity until at the end of his period of treatment they were sufficiently well marked to require institutional care as a manic depressive psychosis in the excited phase. The eye has continued in good condition to the present time, with no recurrence of inflammation or failure in vision. Diagnosis was confirmed microscopically with the interesting note that the choroidal area is densely infiltrated with eosinophils. The period of observation was eighteen months. The result was classified as satisfactory. The diagnosis was confirmed microscopically.

Case 10.—W. S. A., a boy, aged 9 years, was referred with the following history: December 23, 1937, he was injured in the left eye by a fragment of a 22 caliber cartridge. Nothing was done for the injury for a period of ten days. The left eye was removed on the fifteenth day after the injury. On the fortieth day following his injury vision began to fail in the right eye and objects appeared blurred at intervals. This status continued for two weeks and there was no response to the usual treatment. Two weeks after the onset of his visual difficulty in the right eye he was seen in consultation, with the following findings: circumcorneal injection was severe, photophobia marked, the globe sensitive to palpation, and tonsils heavily infected. He had an acute coryza and fundus details were obscured. Vision was 10/30-2, uveal pigment test 3 plus, and the globe was hypotonic. Tuberculin test (O. T.) was positive (+) in 48 hours, scleral tension 4, and corneal 15 (Bailliart's). He was placed upon uveal pigment intramuscularly, beginning with 0.25 c. c. and increasing ¼ c. c. daily until 2 c. c. were reached, at which level the dosage was continued throughout his illness. Because of hypersensitiveness to tuberculin we were never able to give more than 0.4 c. c. of 1/100,000 dilution at intervals of five days to one week. The usual local treatment with atropine, dionin and hot compresses was used in the eye. The tonsils were removed on the fifty-eighth day under ether anesthesia. On March 20, 1939, 268 days after beginning therapy, he was discharged from treatment with a final vision of 20/30, correctable to 20/20 with an appropriate lens.

He continued at the normal level of vision and the eye was quiescent until June 16, 1939, at which time vision became blurred in the right eye and it was found that there was slight circumcorneal engorgement with slight sensitiveness of the globe to palpation. On the hyaloid membrane there were numerous fine dust-like deposits. Pigment therapy was reinstituted and continued for six weeks, at which time the deposits on the hyaloid membrane had cleared completely. The eye assumed a normal appearance and the vision returned to 20/30, correctable to 20/20 with glasses. Subsequent observations showed the eye to be quiescent. A total of 120 c. c. of normal pigment suspension was administered to this patient. The period of observation was twenty-one months. The result was classified as satisfactory.

Case 11.—A. A., a white man, aged 68, was seen in September, 1931, complaining of recurrent painful inflammation in his eyes. His left eye had been operated upon elsewhere six years previously, at which time an iridectomy was performed for the relief of glaucoma. The eye did not heal as it should following the operation, and for a period of approximately one year was inflamed and painful, the inflammation recurring until vision was lost. At the end of a year vision in his other (right) eye became blurred, the eye became inflamed and he was told that he had glaucoma in this eye and was operated upon, an iridectomy being performed. A series of events took place with this eye like that in the left, except that the vision was not entirely obliterated. Operation upon the right eye was per-

formed during a quiet interval in the left, but since that time both eyes have been the seat of recurrent painful inflammation. Examination on admission revealed vision O. D., P. L., O. S. blind. Both globes were inflamed and sensitive to palpation. The cornea of both eyes was cloudy and the anterior chamber of both eyes was filled with dense organized exudate. Both eyes were hypotonic. The patient was in poor physical condition, suffering from a heart lesion, as well as other disabilities incident to his advanced age. The uveal pigment test was four plus in twenty-four hours and pigment therapy was instituted. Dionin and atropine were used in the eyes in conjunction with hot compresses. At the end of two weeks, the pain had disappeared from the eyes and they were less red and at the end of thirty days redness had completely disappeared from the right eye, but remained in moderate degree in the left. At the patient's request, and at the end of sixty days, the left eye was enucleated under local anesthesia. The eye was examined microscopically by Col. Callender, M.C., of the Army Medical Museum in Washington, D. C., with the diagnosis of sympathetic uveitis. Four months later the patient died with a heart attack, but following uveal pigment therapy his remaining eye became painless. The period of observation was twelve months. The result was unsatisfactory. The diagnosis was confirmed microscopically.

Case 12.—P. B., a white man, aged 39 years, lost the sight in his left eye in 1928 following the accidental wounding of the eye with a piece of steel from a cold chisel. Four months following injury the left eye was enucleated under general anesthesia because of persistent pain and inflammation in it. The patient was slightly disturbed mentally and was not accurate in his statements. He showed a marked persecutory trend and blamed all his troubles on others. He was an itinerant beggar and in constant conflict with the police, who he believed centered all their attention on him. As nearly as could be determined there was an interval of between two weeks and a month following the enucleation before trouble came on in the right eye, at which time the vision in that eye first became blurred, then diminished to light perception. An iridectomy was performed on this eye early in 1929, but failed to improve vision. Since that time the eye has suffered recurrent inflammation and pain.

Examination showed vision O. D., P. L. three feet, O. S. enucleated. The cornea was diffusely clouded, and the anterior chamber filled with exudate except at its upper level, where the base of the iris was faintly visible and an operative coloboma could be made out. No fundus details were visible, as the iris coloboma was also filled with organized exudate. It was thought that perhaps the patient could be desensitized and an artificial pupil made for him. The pigment test was four plus, tuberculin test negative. He was given seven injections of uveal pigment, but no improvement was noted from this. The patient failed to return for treatment after his seventh injection and his whereabouts and present status are unknown. Treatment was incomplete and the result was classified as unsatisfactory. There was no opportunity to give the therapeutic measures a fair evaluation in this case due to noncooperation.

Case 13.—V. J. H., a white man, aged 26 years, was seen in consultation through the courtesy of Dr. Scott Bronson, of San Antonio, Texas, September 17, 1932, with a history of having been struck in the right eye with a fragment of flint rock ten weeks previously. The fragment of flint penetrated the globe, but was removed successfully following the accident. The left eye became photophobic and uncomfortable and vision blurred at intervals. Examination showed the right eye to be the seat of a marked circumcorneal injection. Traumatic cataract was present and there was a healed wound at 5 o'clock which had considerable uveal pigment in it. The globe was hypotonic and somewhat shrunken. Vision was O. D. nil., O. S. 20/20. The left eye shows blurring of the nasal margin of the nerve head. It was intensely hyperemic, but its level was not elevated. Numerous fine opacities were present in the vitreous which was abnormally fluid. The globe was slightly sensitive to palpation and photophobic. Uveal pigment test was one plus in twenty-four hours. The diagnosis of early sympathetic ophthalmia was confirmed and enucleation advised, which was immediately performed under general anesthesia. Recovery was uneventful. The patient received two injections of 0.5 c. c. of uveal pigment, normal suspension during convalescence, but left the hospital as soon as possible after enucleation and has failed to return for any further treatment. His visual status is unknown at the present time. Following is the pathologist's report of the excised eye:

There is a penetrating wound, separation of retina, avulsion of the lens and sympathetic uveitis.

The period of observation was three weeks. The result was classified as unsatisfactory. The diagnosis was confirmed microscopically.

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DISCUSSION (*Abstract*)

Dr. French K. Hansel, St. Louis, Mo.—Dr. Gill has presented clinical and histopathologic evidence to indicate that allergy may play an important part in sympathetic ophthalmia. The edema and eosinophilic infiltration shown in the photomicrographs are certainly evidence of the allergic process. In the nose and paranasal sinal secretions we consider an eosinophilia as definite corroborative evidence of allergy. When there is a superimposed infection there is a neutrophilia in addition to the eosinophilia. These changes are also shown in the tissues. Likewise, in sympathetic ophthalmia the pathologic picture may vary according to whether an inflammatory process has been superimposed upon the primary tissue reaction. Dr. Gill's presentation emphasized the value of the correlation of the histopathologic changes with the clinical picture.

Dr. J. Wesley McKinney, Memphis, Tenn.—It has been my pleasure to see one of Dr. Gill's patients before and after treatment with uveal pigment. A 36-year-old man stopped off in Memphis on the way to his home in San Antonio on the fourteenth day following the onset of a severe uveitis of the right eye, which had developed 28 days after a perforating injury of the left eye. Vision was limited to bare light perception in

each eye. There was a partially healed wound at the lower limbus of the left eye with an operative coloboma of the iris and traumatic cataract. Both eyes were intensely inflamed, tender, and very soft. There was no fundus reflex from either eye. The sympathizing right eye was remarkable for its extreme softness, very deep anterior chamber and apparent heavy vitreous exudate. His condition seemed hopeless. Immediately upon arrival in San Antonio, Dr. Gill began treatment. Dr. Gill's report stated that improvement began on the third day after uveal pigment was started. He was seen again in Memphis seventeen months after the onset of his sympathetic disease. Vision in the right eye was 6/6 and J1, and in the left eye, moving objects. In the right eye there were only a few fine posterior synechiae and a filming deposit on the anterior lens capsule. The fundus showed everywhere fine pigment agglomerations. The tension, which had been very low, was normal. The left eye showed traumatic cataract. I have never seen a more spectacular result than was obtained with this patient. The patient is here today if any one cares to see him.

The treatment of sympathetic uveitis with uveal pigment is extremely interesting. It has been shown that true hypersensitivity to uveal pigment develops only after penetrating wounds of the eye involving the uveal tract. A number of cases of chronic recurrent uveitis following perforating injuries have been reported in which pigment hypersensitiveness has occurred without sympathetic ophthalmia. This would indicate that some additional factor is involved in the development of sympathetic disease. It is probable that this factor is an infectious agent, and for this reason the elimination of foci of infection is logical and its therapeutic effectiveness has been borne out by reported cases. It is a well-known fact that allergy is an immune reaction gone out of bounds and antagonistic to true immunity. From this it may be assumed that the development of hypersensitivity to uveal pigment alters the defense mechanism to make it possible for the infectious agent to produce the characteristic disease. If, then, the allergic factor can be eliminated by desensitization with uveal pigment, an effective immunity may be developed by the organism. At least this is a plausible explanation for the clinical improvement observed after pigment therapy.

There has just recently come under my observation an 18-year-old boy, whom I am preparing for corneal transplantation. His only eye is subjected to a recurring sympathetic uveitis. The ophthalmologist who referred him for transplantation had made three attempts to secure a pupillary opening behind a small area of relatively clear cornea. After each operation there was a violent inflammatory reaction and closure of the opening. Light projection is prompt in all fields and the corneal leukoma is favorable for transplantation. It is hoped that desensitization with uveal pigment may render this eye more amenable to surgery. I should like very much to have Dr. Gill's opinion as to whether the typical reaction of the sympathetic eye to operative intervention may be minimized by desensitization with uveal pigment.

Dr. Oscar Wilkinson, Washington, D. C.—I have come to report two cases which I have had the pleasure of seeing which have been treated by uveal pigment. Some ten years ago, when Dr. Gill was in Washington at the Walter Reed Hospital, I had a case of sympathetic ophthalmia in a man of about 46 years, following trauma. At the time Dr. Gill saw this patient his vision was about 5/200, the fundus not visible because of vitreous opacity and some opacity of the lens.

After a series of treatments by Dr. Gill, his vision was brought up to 20/40 and has been maintained at that point ever since.

After using uveal pigment I gave him a series of injections of tuberculin and we thought at the time that we would probably have to do a cataract operation, but I am glad to report that his vision is still 20/40, and he is a very active man.

Two years ago I had the pleasure of visiting Dr. Gill in his office in San Antonio and happened to run into a patient who had been referred to him from Oklahoma. This patient was practically blind in both eyes and each eye was in a highly inflammatory state.

I had a report from Dr. Gill afterwards and the man, I believe, has sufficient vision to go to work, so I think that it is exceedingly important that this type of treatment be carried out in those very difficult cases which are not being relieved by the ordinary methods.

Dr. Gill (closing).—Uveal pigment can be used to good advantage to raise the patient's resistance prior to operation or in the treatment of reactions following operation. Anterior operations will give less trouble if your activity is confined strictly to that zone. In injuries limited to the iris, I have never seen a case of uveal pigment sensitization in inflammations in which there was only an iris or an iridocyclitis. I feel that uveal pigment immunization will offer a considerable degree of protection, but in injuries farther back in the choroidal tract I would be more inclined to try to raise the patient's resistance with nonspecific measures, bearing in mind that hypersensitivity runs concomitantly with uveal pigment hypersensitivity and may be as much a cause in either situation so that it is equally important if not more so in the course of the disease.

THE PRESENT STATUS OF PSYCHIATRY AND PSYCHIATRIC TREATMENT*

WITH SPECIAL ATTENTION TO COMA AND CONVULSIVE TREATMENT

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Annually in September there arrives at our Clinic, as at many others, a group of young men and women physicians, seeking special training in psychiatry. Eager and enthusiastic for the opportunity to see pathologic conditions at first hand and to minister to the need they create, they leave us after two, three or four years, with enthusiasm and eagerness considerably subdued, but manifestly better equipped to handle in a practical manner any and all problems. What

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have we to give them as a view of the psychiatric field, and how does the situation today compare with that of only a few years ago? And particularly, how has the coming of the modern shock methods changed the actual status and the outlook of treatment?

In order to answer these questions, it is necessary to appraise currently our inheritance of the treatment wisdom from the past. The history of psychiatry is a history of broad movements, initiated by courageous men and women, apostles of a new order in their own times, but also the natural product of the widespread ferment and unrest of their own times. These movements reflected significant changes in the conception of the mind-body problem.

Modern psychiatry with Pinel was incorporated within the field of medicine with its strong humane basis. The fate of the humane idea in medicine has been a varied one at the hands of its different interpreters. But medical humaneness has not suffered in America at the hands of its most illustrious modern practitioners. The establishment of the state hospital systems stands as evidence of the acceptance of the obligation of the well to care for the unwell, when being unwell creates stringent economic problems. The movement is a measure of the public humane conscience, and it has survived many predatory political assaults.

As a corollary to the humane movement came the non-restraint slogan. This principle is paid lip service everywhere, and is daily violated. It is like "Truth" or any other abstraction: the relativities in the situation make impossible any absolute adherence. Even the grossest forms of restraint may still be seen in hospitals the country over, and rationalizations for their use will be offered in abundance. In the last issue, non-restraint rests on the principle that the patient with mental disorder can and will respond to a humane appeal to submission to the consensus. Often enough this is true, but the consequences of such a principle carried to its logical extreme conclusions may, in an individual case, be as futile and tragic for everyone concerned as have been the recent efforts to appease dictators. The only workable principle is that non-restraint is the principle of choice, but when its application leads to perversion of the therapeutic goal, namely, the restitution of the individual in his society, through unjustified encroachment on society's rights, then it must be abandoned. I say this with some trepidation, not because it is untrue, but because experience shows that the utmost vigilance is necessary to prevent its abuse through indifference. A more important result of the non-restraint issue was the creation of a new atmosphere in treatment, which sought out the patient before institutionalization became necessary, and led to the birth of the mental hygiene movement.

Ease of hospitalization in established clinics is another corollary of the humane movement. Yet there is still a widespread belief, especially among physicians in general practice, that hospitalization should be delayed until all other measures have been given what is euphemistically called a "fair trial." Patients, literally clamoring for psychiatric help, are still "shielded" from the only contacts which can offer anything tangible. In such fashion is psychiatry kept separate from general medicine.

Administrative hospital psychiatry soon learned that an active program of work and play, in the setting of socialized living, made for ease in the handling of patients and the actual subsidence of symptoms. Every hospital today would declare itself in favor of a live occupational program, with careful attention paid to the erection of a way of living not unlike that of the normal extramural existence. Yet there exists to an undesirable degree a lack of the fullest utilization of the activity principle. It reaches its lowest ebb when patients are prevented from performing useful work for the common good of the hospital because of the insidious and misguided propaganda of sentimentalists who fear the "exploitation of the insane" and of special blocs, either of capital or labor, seeking retention of special privileges; and when patients are harnessed to the program of the hospital without regard to their own individual needs. In general, common contribution to the hospital in an effort to make it the best home for the patients is an accepted principle, and deficiencies in its execution result from a lack of administrative imagination, chronically insufficient funds, and local conditions favoring the development of special attitudes hostile to the program.

The rise of a scientific psychiatry led to an early interest in the problems of constitution and heredity and in brain pathology, under the influence of the dominant figures in neurology. The former studies had a rather inauspicious beginning with the degeneracy issue as presented by Magnan and others, an effort directed to discovering in the physical substratum the telltale footprints of hereditary disorder of behavior. In a way it was a broadening into general pathology

of the interest more closely concentrated by others on the brain itself. The net results of these trends today are seen in the constitution studies of Kretschmer and others, and the efforts at preventive treatment by sterilization, as practiced in Nazi Germany and in various states here.

The latter studies finally led to a clarification of the organic psychoses, especially general paresis, with a simplification and increased effectiveness of the treatment. Efforts to reach similar results in the so-called functional psychoses have failed, despite the huge effort expended on the schizophrenia problem alone. The present disposition in general pathology and in its special application to the brain is to think in terms of functional disequilibria or dysrhythmia. This is best exemplified by the findings in the brain waves of patients with "idiopathic" epilepsy. This method has shown convincing evidence of a constitutional basis for the disorder, a physiologic peculiarity often hereditarily linked with latent or overt manifestations in other members of the family. Brain waves appear at the moment the most promising method of attack on the physiopathology of the brain. The extension of its use to other fields will depend upon careful clinical and statistical correlation of electro-encephalographic findings with isolated elements of behavior in pure culture.

In the extension of the functional concepts of general pathology to psychiatry the most interesting clues are found in the endocrine-metabolic disorders of schizophrenia and in various neurotic states, and in Lewis' findings of cardiovascular hypoplasia in schizophrenia. So far these findings seem to me to be largely incidental, but perhaps none the less important. The main difficulty in all such work has arisen from the effort to relate clearly defined minutiae of pathophysiology to more complex and less well-defined behavior trends in a simple equation. A more promising trend seeks correlation of such pathophysiologic items with simple behavior items included under the large nosological headings.

Psychiatric interest was long focused on hypothetical or incidental anatomical or physiologic anomalies to the exclusion of those things of immediate importance in the life history of the sufferers. This was a direct application of the Cartesian conception of things scientific. Only sporadically did there appear isolated figures with interest in dynamic events. Mesmer was run out of Paris for his teachings and practices. No figure comparable in importance followed until Charcot appeared. Charcot's apologetic championing of the "pathogenic idea" and its role in the production of hysteria is historically important since it foreshadowed two contemporary movements in psychiatry: psychoanalysis as developed by Breuer and Freud, and psychobiology as developed by Meyer.

The story of psychoanalysis need not be recapitulated here. To appraise its present status for the problem of treatment in psychiatry poses a difficult task, and one perhaps best left to others more practiced in its art and system. Yet its import is felt by everyone in the psychiatric field, and my views on the matter are those of one who has lived in an era which has profited by its good and suffered from its excesses, and who has honestly tried to remain a grateful and critical recipient of its contributions.

To me psychoanalysis seems to have exerted its most important influence through the following items, to which certain reservations may be added:

(1) It called attention to the role of certain obscure action tendencies exercising a continuing influence on behavior. It may be argued that it was the special merit of Freud to reduce these trends to the workings of the sexual instinct and to the few other instincts he postulated as its essential antagonists. This is open to serious question, since for many open-minded students the reduction so achieved appears artificial and strained. It may be doubted if anything is gained by such a reduction over the more pluralistic view except a more closely bound systematization of theory.

The exploration of the sexual field was a trend for which the world had long been ripe, but the conclusions drawn from the material have been often hastily conceived and unwisely applied by too many professional and lay enthusiasts, who have had no use for conservative experience. Nevertheless, a great service was rendered to society in making the topic an open one, and I doubt that the most vindictive opponent of psychoanalysis would wish for a return to the pre-analytic days, say to the Krafft-Ebing era.

(2) The forces at work to produce the relative unawareness of certain dynamic factors resting in the early life of the child, particularly in the intra-family drama, have had a profound effect upon the psychology of childhood and adolescence. Again, the reduction of this material to a strictly sexual basis will find its protagonists

and antagonists, but the value lies in the observations, not in the speculations.

(3) The means of rediscovering the data of relative unawareness through free association is a most important contribution. The associations in practice often turn out to be anything but "free," the restriction on the freedom constituting a measure of the active injection of the analyst and his theories into the therapy. I see no objection to this procedure, provided the physician recognizes the suggestive element in the effort he is making and meticulously refrains from doing violence to the first canon of medical treatment: never to allow professional contacts to leave the patient less able to deal with his problems than he was before those contacts were made.

(4) The insistence on the importance of the physician-patient relationship as a parade-ground for the display of those habitual attitudes and activities which are most productive of distress remains the last essential contribution. Granting this does not demand the total acceptance of the theoretical explanations which perforce fall into the general pattern of an instinct psychology. It appears a novel effort to study the actual therapeutic influences at work in the physician-patient relationship.

The effect of all this upon therapy has been profound not only in its most strict application but in the general understanding guiding treatment procedures and aims. Certainly the neuroses are more clearly understood today than in previous years, although many reservations on the completeness of the understanding must be admitted. Unfortunately the actual method is time- and money-consuming, and admittedly may be stringently applied even when desirable to a limited group of cases. There is every reason to know the facts of psychoanalysis and to use them in the most economical fashion. This means in substance that they must be a working part of the physician's repertoire, even when they have little part in the actual methods employed.

The Meyerian movement stems from Forel, in Zürich, who had become interested in hypnosis through the work of Liebault and Bernheim, as opposed to Charcot, and who had written an excellent text on the subject. As a hospital administrator and practical therapist Forel had been interested in occupational therapy and the social aspects of mental diseases, and in the alcohol problem. He had not been swayed by the Kraepelinian nosologic triumphs nor by the popular sexual psychopathology of the Freudian groups. His influence is directly traceable in Adolf Meyer's teachings in America, which became broadened by his contacts with the work of Hughlings Jackson, of Huxley, William James, and many others. The upshot of all this was a simple view of mental phenomena as reactions of the individual inseparably grounded in the biology of the total organism, but not to be confounded with or explained in terms of physiologic processes of separate organs and psychosomatic systems.

The significance of the psychobiologic method for treatment lies in the following items essential to its best use:

(1) Mental phenomena are viewed as dynamic factors for the individual biography, best observed and recorded as the behavior of the individual, overt or implicit.

(2) The behavior for the most part tells its own story and need not be translated into mechanistic terms.

(3) The inquiry revolves about the actual complaint problem, starting with those things most generally accessible and easily understood, and proceeding to more remote material only as the indications arise. So, by contrast with psychoanalysis, the data of relative unawareness play a secondary role, not necessarily in importance but in prime interest.

(4) Treatment proceeds by a careful gauging of the actual pathology of the reaction, comparing this with the patient's conception of the pathology and working toward a rapprochement of the two points of view, remaining close to the practical possibilities. Illustrations of behavior abnormality under actual observation conditions are analyzed for their immediate significance, and linked with past and future as necessary. All traditional and well tried therapeutic methods are employed.

(5) Treatment is always alert to the interests of society in the patient and is never allowed to become a matter of a closed-shop agreement between physician and patient, excluding the social needs.

The aim in treatment of whatever sort is the same, namely, the restoration of function with satisfaction and harmony in living. The dynamic therapies have every reason to work together, to pool resources, and to understand each other's viewpoints and methodologies, since they stand on the common ground of treatment as collaborative effort with the patient. This viewpoint was only tardily achieved and is still

not digested by Kraepelinian psychiatry and other too exclusively organic-minded systems. Collaboration means responsibility for corrective effort as well as an implicit assumption of responsibility for failure, called illness. Kraepelinian method had looked upon man as the passive victim of brain disorders, even when disturbed behavior was the only abnormality noted. Certainly dynamic psychiatry has contributed much to make mental disorder more plausibly understandable than previous viewpoints had permitted, and in the degree of plausibility rests the entering wedge of psychotherapy.

These are the inherited fortunes from the past. Into this situation has been injected a new factor: the so-called shock treatment, whether by convulsion or coma, by electric or chemical or endocrine agent.

This new problem kindled a spontaneous and immense interest, with the immediate and practical question as to the effects on the recovery rate in psychoses obscuring the more detailed studies of the changes in metabolism, general and cerebral, in the electro-encephalographic findings, and in the psychopathology.

In the mass of data reported there is appallingly little relevant to the main question of clinical interest, namely, what is the effect on the psychotic process, in its detail and in general? So far, it seems to me, the actual experience to date corroborates a prophecy I made in 1936 that we stood to learn more about insulin than about schizophrenia from the shock treatments. This is said in no spirit of depreciation of the results so far obtained, since it is certain that no psychiatrist can afford, in the present state of our knowledge, to remain impervious to the opportunities presented by the shock methods.

It is important to bend every effort to the evaluation of the shock methods from the standpoint of their actual effects upon behavior, rather than for their effects upon human physiology. The latter problem is important, but at this time appears to be incidental to the former. It is important for the reason that the injection of the shock methods into the therapeutic armamentarium has created a new and in some degree undesirable unrest in the young physicians in training. They demand action with their patients, and since shock offers a possibility of action, they want it. Unfortunately, when shock fails in its purpose, as may often happen, the physician is left stranded through a dearth of training in the well-tried and useful methods of the past and in constructive imagination which views psychosis as a dynamic experience. Are the demand for direct action and impatience with effort at collaboration only signs of the times? What are the merits and hazards of this procedure? In the past four years we have had under observation a considerable number of patients who have received one or another sort of shock treatment. The treatments have ended in virtual cure, in indifferent results, or in downright worsening of the condition. Sometimes one variety of reaction has been exchanged for another, as for example, the schizophrenic for the Korsakow, where the criteria of "improvement" become a matter of the social taste of the environment.

In the cases where improvement, transient or permanent and without defect, supervened, the following items have attracted our attention as probably significant:

(1) It promotes rapport, in a variety of ways:

(a) In cases near stupor, or simply uncommunicative, shock treatment, and particularly convulsions, have appeared to result in increased willingness and ability to grant rapport. This then could be used for the further study through traditional methods. I have compared this phenomenon with the sudden capitulation of the neurotic patient to a frank discussion of his problems after blocking of effort had been broken by the self-revelations from free associations, dreams, Rorschach test, and so on. It all amounts to a demonstration that the physician has at his command methods of procedure for breaking an impasse which do not depend upon the voluntary cooperation of the patient, and are not to be successfully blocked by inadequate rapport. Certainly one gains the impression that many patients welcome a demonstration of initial skill and power on the part of the physician which relieves them of the initiative in cooperation and in treatment. It reminds one of the crying child who cannot stop crying, but is patently delighted when the performance is rudely stopped by a peremptory demand of the parent. It is as if to say, "Well, that's over; now we can get down to business."

Analysis of why the patient was previously unable to cooperate may prove as futile as questioning of the child may fail to reveal why he had not been able to stop crying of his own accord. One might hazard the guess that the fascination of the autistic life, and its clear gains in the special situation evoking it make a return to personal reality impossible except by the more forceful demonstration of the power of external

reality as shown in the physician's control of the situation.

(b) The methods are valuable in the confused delirioid types of reaction. Contrary to the view that these represent atypical exogenic reactions, close analysis will show that the confusion starts at the top of the integrative process with what might be called a personal disorientation from loss of the guideposts for socially acceptable conduct, especially religious, ethical, and sexual ones. Again, the methods appear to inject in a dramatic fashion the element of external authority resident in the physician, and help the patient to a better personal orientation through reliance upon him.

(c) It offers an opportunity for rapport through the demonstration to the patient of an active interest of the environment in a way not encompassed by the traditional methods where the physician appears more as an adviser. One patient who had been in serious and prolonged shock with transient one-sided abnormal neurologic signs and who was brought to recovery only after much care of an anxious staff, marked that episode as the turning point in her treatment with the remark that from that time on we all seemed to want her to get well, whereas previously she could not believe that of us. Did she sense in our faces and our actions our own anxiety for her and our desire for her recovery?

(d) Since shocks belong to the delirium-like reaction, rapport may occasionally be gained just as in more ordinary deliria by the authority of the physician and nurse to explain unwelcome hallucinatory and delusional phenomena and to soothe anxious emotions aroused by them.

(2) The return to a proper reality value in severe states of depersonalization may be influenced directly by shock treatment. Recently we have had under observation a young schizophrenic with the most complete depersonalization. He denied any taste for food, and declared food went directly through him, turning to water in the process; he was filled with air, and he needed crutches to prevent his collapse. Under insulin treatment he has eaten heartily and, he declared, with good appetite. This seems to have led the way to a more general return of normal feeling regarding himself and his external contacts. If this is a proper explanation of the beginning recovery, it is all the more remarkable, since experience with such marked depersonalization and delusional interpretation is in general most discouraging.

(3) The therapeutic gain through the transient complete blotting out of the psychotic experiences must be noted. We have seen this in topical depressions with serious suicidal risk and agitation. In such cases the choice of treatment was reduced to temporary obliteration of the psychosis. Insulin shock at times seemed preferable to prolonged narcosis because of its better control.

(4) The verbal productions in the pre- and post-coma periods of previously unknown psychotic material offer vantage points for later therapeutic efforts.

(5) The effect of fear, diffuse, or as the threat of death, on the acceptance of reality must be noted, but this factor has been variously significant in different environments. Despite the aim to strip the methods of factors obviously contributing to fear, there may remain, however, an irreducible and perhaps useful minimum. For this reason we prefer electric convulsions to metrazol convulsions, or where fear from metrazol is marked to give the drug when the patient is already comatose from insulin.

One young woman, whose father had suicided, in her illness entertained suicidal ideas as a part of a general futility feeling. Metrazol failed on one occasion to produce convulsions and ended in the common terror experience, which for the first time made her acutely aware of death as an impending event of the utmost unpleasantness. At that moment she felt a desire to live, and her recovery remains as one of our most gratifying results.

(6) The cathartic effect of convulsions upon tense, strained, affective states must be noted. The human normally may use gross motor activity to bring ease into a tense situation, but this is usually purposeful as in the work-outs on tennis courts and golf links. Yet epileptics have been known to look forward to a grand mal attack because of the feeling of relative well-being immediately following.

I do not understand just how the cathartic effect occurs. The data of physiological change brought about by the convulsion offer no real explanation. Neither are the beneficial effects of the tennis match on the tense business man entirely explicable in terms of chemistry change, since the same amount of effort expended in other directions may only make matters worse. The fact that in shock treatment the gross motor activity occurs with the patient unconscious offers further complication, but not necessarily a contradiction to the theory.

We have set down some experiences and some

speculations derived from only a few of the many cases under observation. Many cases, perhaps most, come and go without giving any sure clues as to why things work out as they do. This probably results only from the defective imagination of the treating physicians and nurses, who have been trained to rely too heavily upon verbal communication for these clues. We need the courage to challenge the empirical facts of induced behavior change, to test them from the standpoint of every contributing integrative set. So far the psychobiology of the shock treatments has received scant attention, and it is hoped that a more determined effort will be made to bring illumination to this field.

From the standpoint of training of the young psychiatrist, there appears to be only one view to take: shock treatment must be fused with our heritage of psychiatric wisdom from the past and yet to be reached. It has already enriched our experience and our purchase on some of the most difficult of tasks. It remains, however, to discover why. What is its share in the great humane movement? What of non-restraint? Of brain pathology and general pathophysiology? And most of all, what is its contribution to, and participation in, the understanding of mental disorder as a problem in personal dynamics, with its variable degrees of awareness?

DISCUSSION (*Abstract*)

Dr. Solomon Katzenelbogen, Washington, D. C.—Dr. Muncie's analysis of the history of psychiatry very appropriately points out the close connection between the development of psychiatry and the progress of social humanitarian forces. Much has been accomplished for the good of patients in mental hospitals following the revelations by Clifford W. Beers on the conditions in state hospitals, revelations which had hurt, indeed, humane feelings.

Still more remains to be done, but more radically constructive and therapeutically beneficial reforms within psychiatric institutions will be carried out, inasmuch as the progress of social reforms outside of hospitals will be furthered. It is to be hoped that the modern shock therapies which offend our feelings by the suffering they inflict upon the patients will stimulate more active interest in those therapeutic procedures to which Dr. Muncie calls our attention, procedures which have stood the test of time, and, moreover, whose etiologic and pathogenetic significance can, to say the least, be intelligently discussed, if not always fully understood.

What can be said of the actual state of our knowledge, in this respect, with regard to shock therapies? For my part, I am reasonably satisfied with the general directions of the research work upon insulin and convulsive therapies. Granting that psychobiology concerns itself not only with the function of man as a whole, as a mentally integrated unit, but also with the whole of man, it is obvious to me that the psychobiology of the shock treatments has been the subject of fairly well planned and very determined efforts of study. I feel justified in making this statement on the basis of factual material available in the literature and facts of my own observation. This material, which I recently attempted to systematize in "A Critical Appraisal of the Shock Therapies," shows that both the behavior of the patients and the physiologic manifestations were given serious consideration. On the level of personality function, not only observations of the patients' spontaneous reactions during and after treatments, but also special psychologic studies were recorded. On the level of organic function, physiologic, biochemical, electrocardiographic, electro-encephalographic and histopathologic studies were equally recorded. These, both personality and physiologic studies, regardless of the varied and contradictory opinions they have suggested with regard to the modus operandi of the shock therapies, represent nevertheless a truly psychobiologic attitude which regards physiologic investigations not as incidental, but as a very necessary complement to personality studies.

What should be considered as incidental in the therapeutic armamentarium of the mentally ill is the shock therapy itself. Dr. Muncie's point that the physician-psychiatrist should above all receive training in varied psychotherapeutic procedures and, in my own feeling, more specifically in the psychobiological method of treatment, cannot be too strongly emphasized.

I should like, in concluding, to commend the paper not only for its comprehensiveness, but also, and more so, for its very objective attitude, an essentially psychobiologic attitude, toward those schools of psychiatric thought which, as far as I know, are not the preferred ones of the author, schools which, at any rate, do not provide tools for his daily work. This liberal attitude of Dr. Muncie leads me to restate what I said on another occasion in characterizing psychobiology: "If liberalism, excluding allegiance to any dogmatic doctrine, is to prevail in medicine and psychiatry, the consequence will be more comprehensive studies in various fields, wherever inquiry is possible."

Dr. Walter Young, Atlanta, Ga.—Probably it is a good thing that dogs have fleas; it keeps them stirred up and on the move. One wonders whether this is not true of a great many psychiatrists in their relationships to their patients. What are the criteria upon which some psychiatrists base the assumption of improvement in the patient? One is reminded of a definition which has been given of bad behavior in children, namely: that type of behavior which is annoying to adults. Probably often the criteria of improvement are largely a matter of a reduction of the nuisance value of the patient, irrespective of the efficiency of the end result.

We are apt, if we are not careful, to rationalize ourselves into conclusions which are essentially favorable to ourselves. If we will face these facts squarely, sometimes we may be justified in reducing the nuisance value of a patient to a near-vanishing point. He is then more tractable and more easily handled and is in a chronic state of reduced nuisance value to the community.

It is always a question: which gets more out of the doctor-patient relationship, the doctor or the patient. In shock therapy one cannot help wondering whether

the psychiatrist, with his many frustrations and consequent accumulating hostilities, does not get considerable release by producing convulsions or unconsciousness in the patient. His subsequent relaxed state may produce a better relationship and one more conducive to constructive results.

Since, however, it seems that the body politic must always have fleas, it is quite probably a very good idea to take advantage of this and to study the reactions which may come out of this situation. But we must be careful in all of our approaches to patients, in all of our psychiatric thinking, that we shall be honest with ourselves and face the issues squarely. Above all, we must try, as much as is humanly possible, to avoid rationalizations which interfere with an open mind.

Dr. Beverley R. Tucker, Richmond, Va.—We observe people psychically to the *n*th degree, and the little things that they do often give us a clue. I think that lack of the general power of observation is one of the most serious defects in both the medical student and the practitioner.

Not long ago a case that we had diagnosed as a brain tumor was seen. The patient had been operated upon somewhat successfully and he was applying for compensation and was in the examining room when the intern came into my office and said, "Doctor, I wish you would come in here and see this man. He's a homosexual." The intern had based his remark upon the astute observation that the man had his toenails enameled bright red. I rather congratulated the intern momentarily, until I inquired into the thing, and I found that this man had a daughter 13 years old, and that morning as he was sitting in his chair with his slippers on, without his socks, she decorated his toenails and he had come on up for the examination that way.

I said: "Why did you not take the enamel off before you came for examination?"

"Well," he said, "to tell you the truth, Doctor, I was so dizzy I couldn't lean over to take it off."

There are various things to be inquired into when observations are made.

Another thing I should like to stress is the fact that I think we underrate sub-shock treatment. A good many times in studying emotional reactions of the sensitive hypothalamus I have found that both therapeutically and from the matter of investigation the sub-shock treatment with insulin has been very valuable. I think the shock treatment with its two periods of accessibility and rapport that Dr. Muncie called attention to are also valuable. The periods, I think, consist, first, of the period after giving the insulin and just before the patient gets into a quite restless state, and then the period just after the patient begins to come out of coma, when he is very expressive, often, and very accessible to suggestion.

In the sub-shock treatment of, ordinarily, between 25 and 50 units of insulin, these patients are much more accessible, as a rule, than they are before treatment. I think to establish this rapport and this accessibility we need not always go to shock. Other little things may help. We had a lady who happened to be very fond of flowers. She was from South Carolina and rather poor, and the hospital was full of flowers of other patients while she had no flowers at all. But of course she did not complain of it. In making rounds I had "snitched" a very lovely rose and pinned it on my lapel. When she admired it I gave it to her. We had been trying for two weeks to get the meat of the kernel in that particular case and we could not get it until I gave her the rose. That cleared the matter.

Dr. David C. Wilson, Charlottesville, Va.—I want to ask Dr. Muncie to say something more about his attitude toward the fear reaction. Many persons think it is really the fear of the shock that has the greatest value.

Dr. William R. Griffin, Asheville, N. C.—It is interesting to me to note the reactions of different physicians to shock treatment. One of my friends who is a good psychiatrist and who is doing good work remarked not long ago that if anybody gave one of his patients convulsive therapy he would shoot him. The head of one of our American institutions remarked some time ago that convulsive therapy, he thought, was all a big ballyhoo, that he did not want to do it, but he was going to be forced to do it because other people were doing it.

I have been doing convulsive therapy for a period of time and my results have been very gratifying, for the most part. As in all forms of treatment, we do not get good results in all cases. I have used more of the metrazol treatments than anything else. I have had some most excellent results with them. In some I have obtained no benefit whatever. I remember a patient, a chronic neurotic, who had gone to the depths of depression, who had stopped eating, who was becoming very much emaciated, and after treatment for four weeks this man got up and began to play baseball, to play volley ball, to play croquet, he entered into all the entertainments and amusements of the place and did them better perhaps than he had done them for years. I had known the man for quite a while, and the improvement was remarkable.

I also had a woman 67 years of age, who was brought to me for psychiatric observations. She had been sick over a period of time, and after observing her for two months I called the husband and told him that I thought she was hopelessly ill, that it was well to take her to a state hospital, where he would have to place her eventually, and not spend his money by keeping her in a private institution. He heard of metrazol shock treatment and he came to me and said: "Doctor, I want you to give my wife the shock treatment. I know my wife well enough to know that if she were able to make her choice she would prefer to take the shock treatment at any risk rather than spend the rest of her days in a state hospital."

In this I agreed with him heartily, and then reluctantly I gave her the shock treatment. After a month's treatment the woman began to improve, and in two months' time she went home, and he told me that she was better than she had been for many years. So far as I know she is still well.

We all are aware of how prone we are to grasp at anything that comes along that will offer any help to patients. I have in my care now a young woman whose parents came to me the other day. She has had metrazol, she has had insulin, and now I am giving her electric shock treatments, and with this I am much better pleased than I was with metrazol, because patients do not dislike it, many of them ask for it, many in whom it is not particularly indicated. In cases which seem

hopeless, parents usually say, "I would prefer that my daughter take anything, at the risk of her life, where there is a hope of any relief, than to have her spend the rest of her life in a state hospital."

Dr. Dexter M. Bullard, Rockville, Md.—Shock therapy pays no attention to how the person became sick or what can be done about it through psychotherapy. For that reason, it seems to me that shock therapy is in one way detrimental to psychiatry, because it takes the emphasis away from the matter of how these persons became patients.

I do not believe that any method that does move away from that point of view can ultimately do psychiatry any good. It is a little difficult to say that, in the face of many case reports of improvement, recovery, and so on, but I believe that in the long run there will be more good from the psychotherapeutic approach than from any chemical method which ignores the etiology.

Dr. Muncie (closing).—I might take up your question first, Dr. Wilson. My answer to that is I do not know. I personally am not built to terrorize patients. I never should be able to get away with it, in the first place. I am not as good a hypnotist as Babinski was, who finally terrorized his patients; I have seen him do it, many times.

On the contrary, however, I am not prepared to say that primitive fear may not be of some serious importance in bouncing a patient out of his condition and making him more collaborative. If that can be accomplished in a fashion which does not do damage to the obvious amenities of the situation, so much the better; if it cannot, I still am not prepared to say it is not useful sometimes.

We have to recognize that there are some patients, as I tried to stress with the non-restraint issue, who respond to that sort of thing, and other patients who do not, and it would be a clear abrogation of one's duty in the situation simply to sit tightly upon a principle if a patient's life and welfare are at stake. I should hate to think that I am a terrorist.

I spoke about the subduing effect of three or four years of staying at our clinic upon our interns. I think that is actually a growth in emotional maturity. Our new people respond to cures in their patients with elation and respond to the patients' not getting well with depression, and it seems to me it is the obligation of the people who have gotten beyond that initial stage not to be too elated, not to be too depressed, but to inquire why, and that is what I was trying to do this morning in relation to the relative types of shock treatment. After the initial period of elation at the gratifying results and then the swing of the pendulum in the other direction and hospitals giving up entirely the use of shock methods of all sorts as of no use and no good, I think it is time to grow up emotionally and inquire what is actually being done.

I quite agree with Dr. Katzenelbogen that there is considerable merit in the all-around attack upon the problem which is manifest in the literature today, but I still feel, maybe unjustly, that the psychological implications of the treatment have not received sufficient consideration, and it is those issues which I chose to present this morning for additional comment.

As far as my liberalism goes, I think the state of psychiatric knowledge does not permit one to be anything else in these days, and I should feel sorry for any psychiatrist who felt himself in a strait-jacket of ideas with regard to the treatment of his patients in our present knowledge.

THE SYPHILIS CONTROL PROGRAM IN MISSISSIPPI*

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and
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This paper is presented with the purpose of discussing the syphilis control program in operation in the State of Mississippi. Special emphasis is placed on the progress made and the cost involved in carrying out such a program as part of a generalized health department service.

PROBLEM

A few remarks concerning the syphilis problem will give a better understanding of the material to follow.

Mississippi has a population of 2,009,821, of which 50.5 per cent belong to the colored race according to the 1930 census. Seventy-nine per cent of the population resides in rural areas.

Agriculture is the chief source of income. It accounts for 34 per cent of the State's total as compared with 11 per cent for the United States.[1] Industry accounts for only 9.7 per cent of the total income as compared to 23.6 per cent for the country as a whole. The average annual per capita income is $148. That for the United States is $428.

The prevalence of syphilis in the agricultural areas of the North is low; in the deep South it is high. This is largely due to the fact that a high proportion of colored people live in the agricultural areas of the South.

The greatest concentration of the colored population is in the fertile delta of the Mississippi and Yazoo Rivers in the western part and in the prairie section of the eastern part of the State. Bolivar County in the delta, for instance, has a

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colored population of 74 per cent of the total and Noxubee County, in the prairie, 78.7 per cent. The two sections mentioned, although only a relatively small fraction of the area of the State, have approximately one-half of all the syphilis cases.

The number of syphilis cases is based upon a 25 per cent prevalence rate in colored and a 3 per cent rate in white. According to various surveys[2] these rates are not excessive, although they give an astounding total of about 300,000 cases of syphilis for the entire State.

Private physicians reported 29,062 cases of syphilis to the State Board of Health in 1939. *Table 1* gives by color the number of cases and the rate per 1,000 population reported yearly since 1934. The discovery rate for colored cases for 1939 was 21.4 per 1,000; for white cases it was 5.5 per 1,000.

NUMBER OF CASES OF SYPHILIS REPORTED TO THE MISSISSIPPI STATE BOARD OF HEALTH BY PRIVATE PHYSICIANS

Year	White	Rate Per 1,000	Colored	Rate Per 1,000	Total	Rate Per 1,000
1934	3,854	3.7	8,449	8.1	12,303	5.9
1935	4,292	4.2	9,627	9.2	13,919	6.5
1936	4,782	4.6	11,836	11.2	16,618	7.9
1937	6,644	6.3	17,168	16.1	23,812	11.3
1938	6,534	6.2	21,629	20.1	28,163	13.2
1939	5,888	5.5	23,174	21.4	29,062	13.5

Table 1

It can be seen that the syphilis problem in Mississippi is a large one. The three factors which make it so are: first, the great proportion of colored individuals in whom the prevalence of syphilis is high; second, the rural character of the population making it far removed from and difficult to reach with adequate medical facilities; and third, the low per capita income.

PROGRAM

The first state-wide program for venereal disease control was started in 1918. The State Legislature appropriated $25,000 to initiate the work. Federal funds were received under the Chamberlain-Kahn Act of Congress. After the lapse of Federal funds in 1923, very little was done toward venereal disease control until 1936. In this year Federal funds became available for syphilis control under Title VI of the Social Security Act. The amount received, however, was very small and it was not until after the passage of the LaFollette-Bulwinkle Bill by Congress in 1938 that a state-wide program was again attempted.

Fundamentally, the program is similar to those in other Southern states. It is carried out as part of the regular county health department program.

The Division of Preventable Disease Control is responsible for the administration of the syphilis program. This Division is composed of a director, an assistant epidemiologist, a full-time venereal disease control officer, an entomologist, and four clerks. In addition, the United States Public Health Service loans an officer to this Division. The control officer is in charge of program planning. Personnel and budgetary matters are worked out by the director and the control officer in cooperation with the Division of County Health Work.

The control plan is to establish clinic facilities, medical service, case finding and case holding services in so far as possible in all full-time county health departments. The chief dependence for the execution of the program in the field rests on the county health officer. No attempt is made to establish these services in part-time counties. Free drugs, however, are available to all physicians, in part-time as well as full-time counties, for their use in treating private patients regardless of the patients' economic status.

Communities desiring syphilis control projects are required to provide funds for this specific purpose in addition to funds for general health work. The amount of funds required depends on the need and the financial ability of the local governing unit. Local financial participation is deemed essential.

Clinic physicians are secured by paying local physicians at the rate of $3.00 per hour. Their function is to administer treatment; do the physical examinations, and classify the cases. In some counties local health officers prefer to examine and classify the patients themselves.

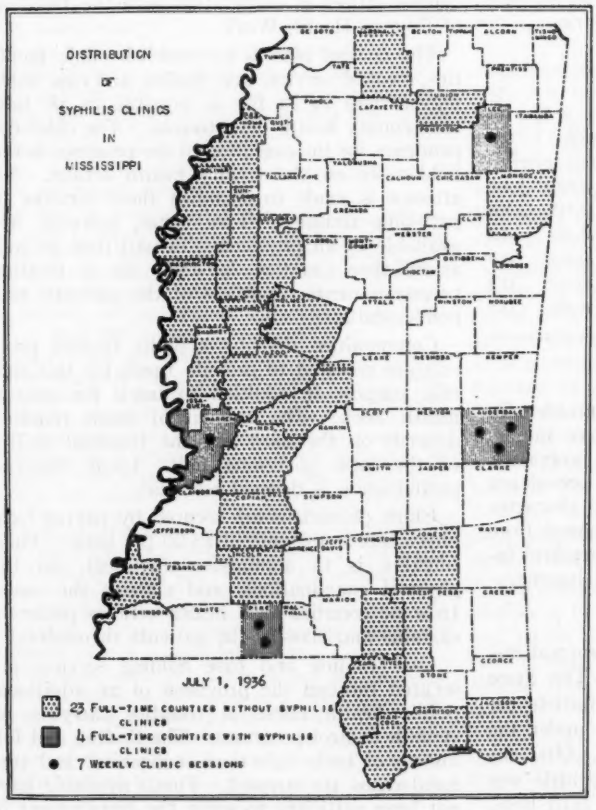
Case finding and case holding services are secured through the provision of an additional public health nurse in counties carrying on syphilis control programs. The finding and follow-up of early infectious, congenital and prenatal cases are stressed. Funds available have not been sufficient to allow the employment of an additional nurse in each county to take care

FEDERAL, STATE AND LOCAL FUNDS MADE AVAILABLE FOR SYPHILIS CONTROL DURING FISCAL YEARS 1939, 1940 AND 1941 IN MISSISSIPPI

	Total	Federal*	State	Local	Federal Match Requirement	Local Funds in Excess of Match Requirement	
						Amt.	Per Cent
Fiscal year 1939	$147,715	$ 54,119	$ 50,000	$ 43,596	$ 11,076	$ 82,520	745.0
Fiscal year 1940	230,155	126,549	50,000	53,606	56,822	46,784	82.3
Fiscal year 1941	266,353	155,600	50,000	60,753	63,100	47,653	75.5
Total	$644,223	$336,268	$150,000	$157,955	$130,998	$176,957	135.0

*Does not include $19,741.09 WPA funds expended during the period October 10, 1938, to June 30, 1940.

Table 2



Map 1

of these activities. For instance, during the fiscal year 1940, 21 nurses were provided while there were 39 counties with syphilis control programs. This is a weak point in the program. Case holding activities in particular fail to keep pace with clinic activities.

The State Hygienic Laboratory performs over 90 per cent of the serologic examinations done in the State. These tests are free. Direct darkfield examinations are performed in the State Laboratory and, also, certain counties have darkfield equipment and personnel trained in this work.

Personnel are constantly being trained. These consist of health officers, public health nurses, clinic physicians, and laboratory workers.

Education of the public is carried on by talks, press, radio, leaflets, and bulletins.

PROGRESS MADE

One of the best signs of progress in health work is, perhaps, the interest shown in the health program by the people served. An indirect measure of this interest might well be given by the amount of local financial participation.

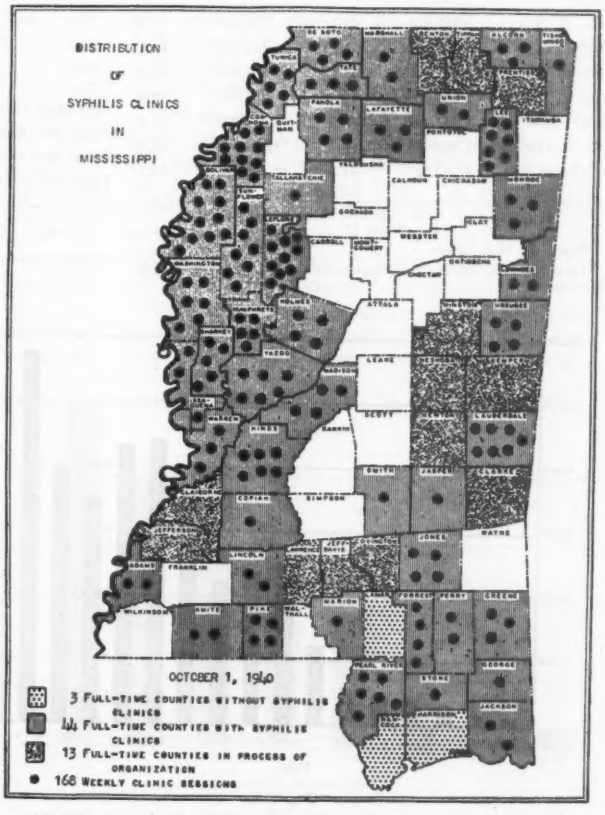
Although the availability of State funds provided the impetus essential for a successful beginning in syphilis control, it was early realized that Federal and local financial participation is necessary to guarantee proper development of the program on a permanent basis. Even before Federal money became available, the State Legislature, spurred by public enthusiasm and approval, provided $100,000 ear-marked for syphilis control for the biennium 1938-1940. A similar amount has been appropriated for the present biennium (1940-1942). So far, the amount of money made available by counties, cities, and individual contributions is an encouraging sign and reflects the great interest shown in this work by the people. More than twice as much money as required to secure the Federal allotments for the fiscal years of 1939, 1940 and 1941 has been made available by State and local governing bodies and by individual contributions (*Table 2*). In addition to this cash outlay, clinic quarters have been provided either by use of existing buildings or through new construction.

Since the plan in Mississippi is to establish clinic facilities for the treatment of syphilis only in counties with full-time health departments, the expansion of clinic service is dependent upon the growth of general health services. Incidentally, this policy has been one of the greatest influences toward securing full-time health units for 18 counties since 1938 and for 13 counties now in the process of establishing full-time health services. The public, in order to realize its objective, facilities for the treatment of syphilis, is setting up full-time general health services where such services otherwise would not be made available. Thus the syphilis control program has been a powerful stimulus toward the expansion of health work in general.

From a modest beginning in 1936 with four full-time counties out of 27 providing seven weekly clinics for the treatment of syphilis, there are at present 44 full-time counties with syphilis control programs conducting 168 weekly clinics. *Maps 1* and *2* show how this growth took place. Syphilis clinic service in all of the newly organized counties was provided immediately after organization or shortly thereafter. Only 3 out of 47 counties with full-time health services have failed to provide for the treatment of syphilis.

Map 2 shows, in addition to the distribution of clinics as of October 1, 1940, counties which have recently made appropriations or indicated the intention of establishing full-time health departments after October 1, 1940. Most of these have also provided for syphilis control service.

This expansion of syphilis clinic service as well as of general health services becomes even more emphasized when translated into the percentage of the population of the State that might avail itself of these services. The most highly populated areas in general are those most capable financially of providing full-time units. Consequently, in view of the fact that over half



Map 2

of the counties in the State have such units or have appropriated funds for their establishment, a rather small percentage of the population finds itself without full-time health services including facilities for the treatment of syphilis. *Table 3* reveals that as of October 1, 1940, 68.7 per cent of the total population was being provided with full-time health services and 63.9 per cent with syphilis clinic service. General health and syphilis clinic services will soon be available to an additional 9 per cent. This represents an increase from 48.7 per cent to 77.9 per cent in the population served by full-time health departments and an increase from 7.7 per cent to 73.2 per cent in the population that might avail itself of syphilis clinic service since 1936.

A measure of the activity of these increased facilities for the treatment of syphilis can, probably, most effectively be shown by the number of treatments administered. *Table 4* shows that a total of 719,556 arsenical and heavy metal treatments have been given since July 1, 1936. It also gives the yearly totals and the percentage increase in treatments administered over each previous year. *Fig.* 1 present graphically the increase in number of treatments by three-month periods. During the last fiscal year there was an increase of 38.9 per cent in the number of treatments administered over the year 1939. A total of 44,500 cases have been admitted to the clinics from July 1, 1936, up to July 1, 1940.

We are told that in early syphilis a minimum of twenty arsenical treatments and a similar amount of heavy metal are required to render a patient permanently non-infectious. A small amount of treatment is apt to break down the patient's immunity and make him more susceptible to neurorecurrence and mucocutaneous relapse.

To determine how adequate treatment has been the clinical records of all cases admitted to

NUMBER AND PER CENT OF POPULATION IN MISSISSIPPI SERVED BY FULL-TIME HEALTH DEPARTMENTS AND BY SYPHILIS CLINICS

	Full-Time Health Departments		Syphilis Clinics	
	Number	Per Cent	Number	Per Cent
July 1, 1936	980,633	48.7	156,047	7.7
July 1, 1937	1,027,859	51.1	241,165	11.9
July 1, 1938	1,106,792	55.1	603,976	30.1
July 1, 1939	1,205,509	59.9	993,464	49.4
July 1, 1940	1,327,298	66.0	1,231,992	61.3
Oct. 1, 1940	1,380,748	68.7	1,285,442	63.9
†Projected	1,565,987	77.9	1,470,681	73.2

Table 3*

*Based on 1930 census.

†Includes areas having made appropriations for full-time health departments.

NUMBER OF TREATMENTS GIVEN YEARLY AND PERCENTAGE INCREASE OVER EACH PREVIOUS YEAR

	Arsenicals	Heavy Metal	Total	Percentage Increase Over Previous Year
Fiscal year 1937	10,424	10,695	21,119	——
Fiscal year 1938	56,036	41,330	97,366	361.0
Fiscal year 1939	137,152	114,496	251,648	158.4
Fiscal year 1940	178,023	171,400	349,423	38.9
Total	381,635	337,921	719,556	

Table 4

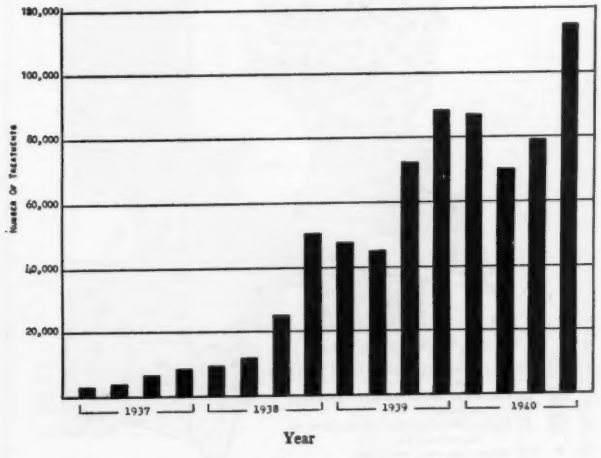


Fig. 1
Number of treatments given by quarterly periods, fiscal years 1937-1940.

a clinic representative of the average for the State were reviewed. The clinic chosen has both a rural and urban population element and about the average in medical service facilities and nursing follow-up. The county in which the clinic is situated does not have a public health nurse paid from syphilis control funds. The nursing service available for syphilis control is largely consumed in clinic operation.

Of the 1,342 cases admitted since the clinic was organized, 224 were admitted less than 40 weeks prior to the time the records were reviewed. The latter cases were eliminated, as were 22 others, because of having been transferred or having had treatment difficulties. Of the 1,096 cases remaining 508 were early and 588 late syphilis. Of the early cases 154, or 30.4 per cent, received at least the 20-20 standard recommended by the Cooperative Clinical Group to guarantee against infectious relapse. *Fig. 2* shows the number of treatments missed in the first 40 weeks of treatment by the entire group (310 early and late cases) that received at least the 20-20 standard. Twenty-five per cent did not miss a single treatment; 40 per cent missed from one to ten treatments; the remainder missed anywhere from eleven to thirty-five.

Although the percentage of cases receiving the minimum treatment for noninfectiousness is not at all impressive, it is felt that the results obtained is a fairly good average in view of the fact that follow-up service was limited. This average could be greatly increased if adequate case holding services were available. As it is, the treatment received is a great deal better than the three to six treatments most syphilis patients received in the past before public clinic service was available.

Attention is directed to the fact that many of the cases receiving less than the 20-20 standard approximated this standard. Similarly, many of the cases receiving at least the 20-20 standard for noninfectiousness had received or approximated the 30-40 standard for "cure."

Increased activity in syphilis control work has not been limited to health department clinics. Private physicians have shown increased interest in the work and now are familiar with and understand the aims of the syphilis control program. *Table 1* shows that where private physicians in 1935 reported 13,919 cases of syphilis, in 1939 they reported 29,062 cases, an increase of 109 per cent. Physicians are provided free antisyphilitic drugs for the treatment of these cases regardless of the patient's economic status. Prior to August, 1939, drugs were furnished only for indigent cases. During the fiscal year 1940, 149,901 doses of antisyphilitic drugs were distributed to private physicians for the treatment of patients under their private care.

COST

Since the cost to the syphilis patient of taking treatment from private sources is far above the ability of many to pay, and has been a responsible factor for the organization of public clinics, it is interesting to note what the cost per treatment has been so far in the public clinics in Mississippi.

The expenditures for the fiscal years of 1939 and 1940 were $351,412.86 (*Table 5*). Out of this there was an unexpended balance of approximately $20,000 in drugs and supplies, leaving an actual expenditure of $331,412.86.

The largest single item of expense was for drugs, clinic equipment, and other supplies. For the two years under consideration it was 45.4 per cent of the total cost. A considerable amount of this expenditure was for permanent or unexpendable equipment for new clinics. As the program reaches its limit of expansion the amount so expended will diminish.

Since the number of treatments administered during this two-year period was 601,071, the average cost per treatment was 55 cents. On a

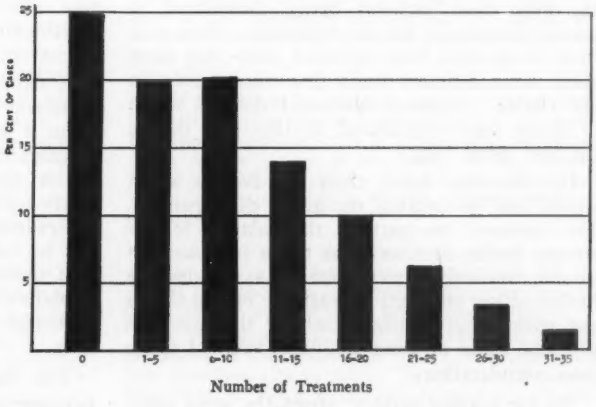


Fig. 2
Number of treatments missed in first forty weeks by a group of 310 cases.

EXPENDITURES

	Fiscal Year 1939		Fiscal Year 1940		Total	
	Expenditures	Per Cent of Total	Expenditures	Per Cent of Total	Expenditures	Per Cent of Total
Administrative	$ 7,262.05	6.2	$ 11,002.93	4.6	$ 18,264.98	5.4
Medical service	25,003.69	21.5	35,445.81	15.0	60,449.50	17.2
Nursing service	12,548.48	10.8	41,103.18	17.5	53,651.66	15.4
Clerical service	1,858.75	1.6	9,912.16	4.2	11,770.91	3.4
Clerical service (WPA)	7,803.99	6.7	11,937.10	5.0	19,741.09	5.5
Laboratory technicians	2,458.00	2.1	3,918.66	1.6	6,376.66	1.8
Training of personnel	4,476.41	3.8	6,840.49	2.9	11,316.90	3.2
Drugs, clinic equipment, supplies, educational material, etc.	51,834.32	44.5	108,482.72	46.1	160,317.04	45.4
Contingent	3,001.53	2.6	6,522.59	2.8	9,524.12	2.7
Total	$116,247.22		$235,165.64		$351,412.86	

Table 5

per visit basis the cost was slightly less. Since there were 722,416 clinic visits, the cost per clinic visit was 46 cents. The per treatment and per visit costs include expenses necessary for the performance of serologic tests.

In arriving at this cost there were a number of factors difficult of proper evaluation. It is believed, however, that these factors have worked for an estimated cost in excess rather than in a shortening of the real cost. For example, the cost of permanent clinic equipment has not been amortized over a period of years. Also, the drug item includes drugs distributed to private physicians, but the treatments given with these drugs have been excluded, since they were given on a different basis than those given in the clinics. Eighteen thousand dollars' worth of drugs were distributed in this way during the last fiscal year.

On the other hand, there are factors which would tend to balance the above discrepancies. For instance, no part of the salaries of the county health directors was taken into account in the medical service item. As a rule, the health officer conducts at least one or two clinics per week. Furthermore, cost for the provision of clinic space or clinic buildings was not taken into consideration.

As for nursing service, about the same number of public health nursing days per week were devoted to syphilis control work as were provided for from syphilis control funds. One hundred and nineteen nursing days per week were so provided during the fiscal year 1940. Of these, 77 nursing days per week were required for clinic operation. Twenty-nine nursing days were required per week for the 14,000 home visits made, leaving 13 days per week for educational and other activities.

Training of personnel, although not directly concerned in treatment cost, has been included. This item represents 3.2 per cent of the total cost. Thirty-one private physicians, 9 full-time health officers, 5 nurses, and 7 technicians were trained in this two-year period.

It should be borne in mind that the cost per treatment or per clinic visit as here calculated is for a syphilis program conducted as part of a generalized health program in full-time county health departments with relatively inadequate follow-up service and limited facilities for special examinations. In that respect it may not be fair to compare it with the cost of $1.03 per visit quoted by Keidel[3] for the Johns Hopkins Syphilis Clinic (1931) or that of $1.00 per visit estimated by Nelson and Crain[4] in Massachusetts.

The State Hygienic Laboratory during the two-year period under consideration performed serologic tests on 321,121 blood specimens at a

total cost of $11,840.76. The cost amounted to approximately 4 cents per specimen. This cost includes money expended for the salaries of technicians employed and for the equipment, glassware, animals, and reagents necessary to carry out the tests, excluding blood collecting tubes. It does not include any part of the salary of the laboratory director. The Eagle modification of the Wassermann and the Kline diagnostic flocculation tests were performed on all specimens positive to the Kline exclusion test.

SUMMARY

(1) A large share of the syphilis problem in Mississippi is due to the high proportion of colored people in the population (50.5 per cent). This, together with the rural character of the population and the low per capita income, make syphilis control one of the greatest public health problems in the State.

(2) The syphilis control program instituted is carried out as part of the regular county health program. Fundamentally, it is similar to the control programs in other Southern states.

(3) Advances so far made in syphilis control may be measured by: (1) local financial participation to the extent of over twice that necessary to meet the match requirement for Federal funds; (2) an increase in number of weekly clinic sessions from seven in four full-time counties in 1936 to one hundred and sixty-eight weekly clinics in forty-four full-time counties by October 1, 1940; (3) an increase in the population served by syphilis clinic service from 7.7 per cent of the total in 1936 to 63.9 per cent by October 1, 1940; (4) the administration of 719,556 treatments during this period of time with an increase of 38.9 in the number of treatments administered during the past fiscal year; (5) and by the increased interest in the treatment of syphilis shown by private physicians, to whom 149,901 doses of antisyphilitic drugs were distributed in 1940 for the treatment of private patients.

(4) The cost involved in carrying out a syphilis control program in connection with a generalized health program amounted to 55 cents per treatment for the fiscal years 1939 and 1940. The cost per clinic visit was 46 cents. Four cents was the average cost per blood specimen for the performance of serologic tests.

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DISCUSSION (*Abstract*)

Dr. J. R. Heller, Jr., New Orleans, La.—The application of venereal disease control methods to large masses of populations is incompletely reported and the material outlined by Drs. Erickson and Galloway contributes to a much-needed reservoir of methodology.

Morbidity reporting of syphilis and gonorrhea by private physicians in Mississippi is far above the average of the country. The attention of public health administrators should be redirected to the importance of this phase of the control program. Apparently the simplified method of reporting the presence of communicable diseases is an important factor in bringing the private physician to realize his place in the public health program.

In no state is the problem of syphilis in the Negro greater than in Mississippi. The philosophy of the Mississippi Department of Health is to project every health service through full-time units, and venereal disease control has been extended in accordance with this principle. It should be apparent that only in this manner can all approaches be considered for the control of the heavy rate of infection among Negroes. Case holding and case finding can best be performed in rural areas in conjunction with generalized public health programs, and educational efforts are best sustained when incorporated in long range, well planned campaigns embracing the many phases of general public health.

The national defense program focuses attention upon venereal disease control and it is imperative that the best in syphilis and gonorrhea control programs be culled and utilized in areas surrounding military establishments. Since many of the important Army and Navy training centers are in the deep South, the experience of the Mississippi workers can be studied and adapted advantageously for modifying programs in other states.

Perhaps the best tribute to the syphilis and gonorrhea control program in Mississippi is that paid by the Legislature in the form of a generous ear-marked appropriation for this service. This is from a state whose per capita income is one of the lowest in the country. People are willing to pay for a service they can see and which is interpreted in a manner understandable to everyone.

Dr. C. B. Tucker, Nashville, Tenn.—Mississippi has a large syphilis problem, since approximately 50 per cent of the population is colored. Fortunately, in Tennessee only 17 per cent of the population is colored.

The Mississippi State Board of Health is to be congratulated on the completeness of case reporting which they have been able to obtain. In 1939, the Tennessee Department of Public Health first required that syphilis cases be reported by name. It is most important that

this requirement be made. Unless the names of cases are available it is impossible to eliminate duplicate reporting. The elimination of duplicates is necessary in order to study the incidence of syphilis in any area. We were afraid that this requirement would decrease the completeness of case reporting. This was not found to be true. The number of cases reported during the first ten months of 1940 was equal to the number reported for the entire year in 1939. During the past six years the annual number of cases reported has increased by 125 per cent.

The Mississippi State Board of Health is also to be congratulated in being able to obtain an annual appropriation of $100,000 ear-marked for syphilis control. The first appropriation for this purpose was made in Tennessee in 1939, $16,000 being appropriated per annum.

The authors have stated that a large portion of the clinic population is handled in Mississippi by part-time physicians. We have not used part-time physicians in Tennessee except in the large cities. In cities, it is possible to find young physicians who are in the process of establishing a practice. They are usually glad to earn some money to pay for office expenses. As a rule, these men have had recent training in clinic technics. If they have not had this experience, they can be given training in a very short time.

In rural areas in Tennessee, a different situation is found due to the fact that there is a scarcity of physicians. Those physicians who are adept at technics or who could easily develop such technics usually are busy with their practice and have not time to participate in the syphilis program. For this reason we believe that it is important to use full-time clinicians in rural areas where possible in order to eliminate some of the cardinal factors which cause delinquency.

Syphilis clinics were first organized in county health departments in Tennessee in 1924, and by 1928 all local health departments had established one or more clinics. Since 1928 as new county health departments have been organized, a syphilis control program has been started at the same time that other services are started. Usually there is a small group of patients referred immediately to the new health department by physicians in the areas. These patients act as a nucleus for a syphilis clinic. The health officers act as clinicians. Case finding and case holding procedures are carried on by the health officers and nurses. Among the total number of early cases of syphilis admitted to the clinics in twelve representative counties in Tennessee during 1937, 47 per cent received at least 20 doses each of an arsenical and a heavy metal within one year of the time of admittance.

The difficulties encountered in carrying on an adequate syphilis program in counties with large colored populations are appreciated. We have several such counties in west Tennessee. To meet these difficulties two itinerant clinicians were employed in 1939 to supplement the work of the health officers in these counties. This plan did not prove to be satisfactory and was discontinued in September of this year.

Perhaps the mobile unit is the answer to the medical personnel problem in counties with large colored populations. The mobile unit plan has proven quite satisfactory in Shelby County, Tennessee. Consideration is being given to the placing of a mobile unit to travel in three counties in west Tennessee. The colored population in this area represents approximately 60 per cent of the total. Such a unit would travel over the three counties, offering general public health clinic services, including venereal disease service to the rural population.

The Mississippi State Board of Health is to be commended for its program in staff instruction in syphilis control. Recently the Tennessee Department of Public Health started the training of supervising nurses in this field. These supervising nurses in turn will instruct local health department nurses in case finding and case holding procedures. I believe that the training of general public health nurses in the epidemiologic features of syphilis control is an absolute essential for success of the program.

Dr. W. S. Leathers, Nashville, Tenn.—Dr. Tucker mentioned the fact that those who had syphilis in Tennessee were reported by name. This procedure brings up a controversial question in morbidity reporting. I am wondering if the names of private patients are reported in this way. He referred to the fact that the number of cases reported had been greatly increased, but, of course, this could have occurred by reporting indigent patients. I am also wondering if hospital reports are obtained in the same way from state and private institutions.

The other inquiry which I wish to make is with reference to the treatment of venereal diseases as outlined in Tennessee by Dr. Tucker. I believe he said that four full-time physicians are used in rural areas for this purpose and that part-time physicians may be used in urban areas.

It seems to me there is a point that may be justly raised in this procedure, and that is whether certain private physicians or those in general practice are being afforded opportunity to get postgraduate training in the treatment of venereal diseases. Unless this is done, it would appear that the service which physicians may provide from day to day would not be improved as much as it should be. The contribution which the general practitioner may make in this regard might be of great value to the state health program. I refer particularly to providing opportunity for them to improve the quality of their work as practitioners.

I wish also to emphasize the desirability of affording opportunity to undergraduate medical students for training in the diagnosis, treatment and control of venereal diseases. I am certain that most medical schools do not place sufficient emphasis upon this phase of their teaching.

These seem to be practical points of importance to me.

Dr. W. K. Sharp, Jr., Washington, D. C.—When funds became available for official health work through the Social Security Act, and especially the Venereal Disease Control Act, there was a tendency on the part of some state and local appropriating powers to assume that the Federal Government would carry a major part of, and in some instances the entire finanical load of the venereal disease program.

We frequently hear the statement, that "The Federal Government now is appropriating funds to provide for our health problems, therefore, we have no problem insofar as appropriating funds."

In Mississippi, the Legislature appropriated $100,000 for the biennium for venereal disease control. The Legislature was assured by the state health agency that these and the major portion of the Federal venereal disease control funds would be expended in the local areas, since venereal disease, not unlike any other communicable disease, can best be controlled in the area where it exists.

It is an established policy in Mississippi that in order to reap full benefits of a generalized public health program it is necessary to maintain a well-balanced, full-time health department under the direction of competent, well-qualified professional personnel.

Local health departments are essential. Therefore, it is an extremely important point for us to keep forever in our minds that the Federal Government is merely assisting the state and local agencies in the development and maintenance of full-time health departments and that venereal disease control is a basic function of the local health department.

Dr. J. A. Hayne, Columbia, S. C.—I have been a health officer much longer than anybody here. Now, of course, we started out with the idea that we would prevent disease. We took that as a specialty of medicine. We considered ourselves as specialists in public health. The first break in that continuity was when we took over tuberculosis and its cure. We had some excuse, because we isolated these cases, took them out of the community where they were and, in a sense, did prevent tuberculosis.

The next step along the line of getting away from preventive medicine into curative medicine was syphilis. It does make our work very complicated, in the fact that we have to treat a disease instead of preventing it.

Now, our health officers were trained in preventive medicine and had the usual education that a man gets at medical school, which is a minimum of syphilis. I think my school had a course of six weeks' lectures on syphilis. Of course, as Dr. Leathers said, physicians come in contact with syphilis all the time during their medical career, but that is the only special course, six weeks.

Now, you cannot in six weeks make a health officer with special training in preventive medicine and ask the same man to treat a disease which requires an extremely technical method.

The next step toward curative medicine in the public health department was crippled children. By no manner of thought can we think that the treatment of crippled children prevents children from being crippled.

The last thing that we had pushed in our faces was the fact that we must treat cancer. Now, we know nothing about cancer at all. Even the experts know very little about it. We as general practitioners and as health officers know nothing either as to the cause, prevention or cure, yet we are attempting to do that.

It gets back to this proposition: we have to call upon the medical profession to do curative work. We may guide them; we may furnish them with money; we may do everything of that sort, but we cannot expect a specialist in preventive medicine, a health officer, to do all this curative work.

Dr. A. L. Gray, Jackson, Miss.—I would like to mention two or three facts about the reporting of venereal diseases in Mississippi. We would like to know the identity of all of our cases of syphilis and gonorrhea if we knew what to do with the identification after we had it. The truth of the matter is, that we know of more cases of syphilis already than we can handle. From the standpoint of our own program, we see no particular reason why, at the present time, we should ask physicians to report syphilis and gonorrhea by name of patient.

Remarks were made in regard to the use of part-time physicians in operating a venereal disease clinic. In Mississippi this was found to be unsatisfactory in some instances. After two years of operation of these clinics, using the same part-time physicians all the time, it is found that their work has improved tremendously and most of these physicians are now doing acceptable clinic work. Without the help of the clinic physicians in Mississippi, the program would be hampered, because the health officers would have time to do nothing but clinic work. In many counties we have as many as eight to ten weekly clinics. With a health officer trying to operate eight or ten clinics in which he is treating anywhere from 500 to 1,000 patients a week, it would be impossible for him to do anything but treat those patients.

It is felt that the full-time clinician might help in operating a clinic program on a district basis in some instances. This has recently been initiated in one area in the state to relieve the health officers of some of the burden of the clinic program.

Last year the medical service cost in the Mississippi syphilis program was 17 per cent of the total expenditure of venereal disease funds, and it is felt that it is not extremely high. Nursing cost was about 17 per cent.

Dr. Galloway (closing).—Dr. Leathers asked me questions way back in 1919-20, when he was Dean at our medical school at Oxford. I am not going to try to answer his question, but I am going to make one or two remarks about it.

Formerly we had the moral viewpoint about venereal diseases; that is, we had infectious diseases, and then we had the moral diseases, syphilis and gonorrhea. About fifteen or twenty years ago, we began to consider treating them merely as infections.

We cannot treat these diseases like ordinary infectious diseases, and we cannot treat them, either, like moral scourges.

We have found that in a case of diphtheria the name, address, age, sex, color, and so forth, of the patient are

very useful. It may be that in other states it is just as necessary to have the name, age, sex and color of a case of syphilis or gonorrhea, but I do not believe that in Mississippi we find that so helpful or so useful, because we had 29,000 cases reported just by number last year by private physicians. At the same time we admitted 17,000 cases to our clinics.

Now, there might have been some inaccuracies in the number of cases the physicians actually had, compared with what they reported, but we are pretty sure that the 17,000 persons whom we admitted to clinics had syphilis.

The follow-up of a case of syphilis is one of the most important points in the whole handling of the case, because it takes a year or more of painful, troublesome, bothersome medication. The follow-up of the case, the encouraging of the patient, the helping him to meet the troublesome problem of taking treatment, is one of the most serious obstacles.

Of the 29,000 cases which physicians reported, if we had the names, addresses, sex and color, we should just have to file them. We had to file about 10,000 of the 17,000 cases that came to our clinics. We used the excuse that they were latent cases. Of course, they may go into neurosyphilis, may be crippled, and they ought to be followed up.

We had only twenty nurses in the forty counties that operate syphilis clinics. We should have had at least forty. A nurse costs at least $2,000 a year. We should have had twenty more nurses; we should have had $40,000 more of follow-up service in our clinics. To have followed up the 29,000 cases that the doctors reported, scattered over all the counties, organized and unorganized, would have required probably 100 more nurses. There is $200,000 more.

At the present time I see very little value in having the age, name, address, sex and color of either syphilis or gonorrhea from the private physician. We may find it useful later on.

I want to say one more word about Dr. Leathers' second point, part-time clinicians. I think Dr. Hayne had that in mind. He said the health officer cannot do all of medicine. That is true. We know, too, the medical profession itself, leaving the health officers and health workers out, cannot do all of it, either. Then, what is the answer?

The answer is that medicine should again become one great, single profession, actually and truly. It used to be that way one hundred or two hundred years ago, just the doctor. There was not any public health or scientific prevention of disease. We grew apart. Now we are finding, as we ought to find, that we need to get back together.

Our attempt in Mississippi to bring these physicians out in the counties, in the little rural centers, into our syphilis control program is an effort to bring back together again the great body of medicine. If we all work together on syphilis, we can have interstaff training of clinicians in our syphilis clinics, as we do of our health officers.

It is a very important point to bring in the practicing physician and give him a job in public health. Then, together, we can solve most of our health problems.

THE HAY FEVER PLANTS OF THE SOUTH*

By ROGER P. WODEHOUSE
Yonkers, New York

Too Much Pollen.—Hay fever plants of the South are very much like those of the North. Hay fever plants the world over have certain characteristics which set them apart from their fellows. These are the very characteristics which make them hay fever plants. It is too much pollen in the air which causes us to have hay fever, not just average amounts, but excessive amounts, amounts beyond what the plants need for their own uses and beyond what the human race is ever likely to have experienced under what might be considered normal or natural conditions of vegetation. Find the plants which produce too much pollen and you have found the hay fever plants.

Two classes of plants produce too much pollen for themselves: cultivated plants, including shade trees and nut trees, and agricultural weeds; in other words, plants associated with human activities. It is in recognition of the fact that hay fever plants are in some way associated with human activity that the affliction has been called a "disease of civilization." Man has taken a fancy to a certain group of plants, among them the agricultural grasses and some particularly beautiful and useful trees, and wherever he goes he takes them with him because he feels his civilization to be incomplete without them. At the same time man's mode of living, which he considers to be civilization, opens the road to a whole host of weeds which include all the worst hay fever plants. It is among our agricultural pets and our agricultural pests that we must look for the hay fever plants.

Of course there are minor differences between the hay fever of the South and that of the North imposed by climate, but this is as much a matter of the behavior of the plants as of the differences in species. The same principles and, for the most part, the same species are involved in both regions. Hence it is best first to consider the problem as a whole without regard to latitude.

Altogether there are relatively few plants which cause hay fever, perhaps about 35 of the

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many thousands which grow naturally in America. This is because to cause hay fever a plant must have a number of very special qualifications which rarely all occur in the same species. Their pollen must have three characteristics: abundance, buoyancy and toxicity. Moreover, the corollary of this is also true: if the pollen is abundant, buoyant and toxic, it is sure to cause hay fever.

Abundance.—The abundance, of course, applies both to the plants as they grow and to the amount of pollen each sheds. The first is easily observed as you pass along the streets. Generally they are the plants which are encouraged either accidentally or intentionally by human activity, such as the cultivated grasses or the street trees, or the weeds of vacant lots and waste places. Never are they of that vast multitude of plants which are suffering, sometimes near to extinction under the impact of civilization, such as the prairie grasses, orchids and lilies, or the pine trees.

The abundance of pollen that each plant sheds is less obvious, but it can be observed by keeping a flowering branch in water for a few days in a quiet room. If the table becomes dusted over with a film of pollen there is probably enough to be important. Otherwise not.

Buoyancy.—The buoyancy can be tested in the same way. After the plant has stood for a day or two on a table, just tap it with a pencil. If the pollen can be seen falling slowly in a cloud and can be blown away by the breath, it is buoyant enough to cause hay fever. But if it falls straight down in clumps like bread crumbs it is not buoyant enough. The pollen of sunflower, dahlia and goldenrod is like this. It falls from the flowers, often making annoying yellow smears on table covers, but it is not easily blown away so the plants are ordinarily harmless in hay fever, despite the fact that their pollen is abundant and generally frightfully toxic to ragweed-hay fever patients. Sunflower pollen qualifies in abundance and toxicity, but fails to qualify in buoyancy.

Toxicity Runs in Families.—Ragweed is one of the most toxic hay fever pollens known. And the reason why the pollens of such non-hay fever plants as sunflower, dahlia and goldenrod are toxic to hay fever patients is that they are in the same family as the ragweed, the sunflower family. Only a few plant families possess pollen toxicity, but when they do this toxicity extends to most or all of the members. Thus it is that all of the hay fever plants belong to only a few plant families.

THE GREAT COMPOSITE FAMILY

One of the largest families of the flowering plants is the composite or sunflower family. It is called composite because the most obvious character which they all have is their "composite" flowers. Their flowers are always actually minute, but are grouped closely together in heads which often look like the single flowers of other plants. Sometimes these heads are large and showy as those of the sunflower, dahlia and daisy, or they may be small as in the goldenrod. There are over 20,000 species in this family, and, though the pollen of all is probably more or less toxic to ragweed-hay fever cases, and many of them produce it in great abundance, only a few are actual causes of hay fever, only those which are unduly abundant themselves and produce a great abundance of buoyant pollen.

There are only two groups among the composite family which are wind pollinated, the ragweeds and their allies, and the sagebrushes and their allies.

The Ragweeds and Their Allies.—The ragweeds are the most important members of this family, between them responsible for a good deal more than half of all the hay fever in North America. There are four species involved in the South.

Short ragweed is the commonest and has the widest distribution, ranging from Nova Scotia to Cuba, and westward as far as the foothills of the Rocky Mountains. The flowers are wind pollinated so they are not conspicuous. The staminate flowers which bear the pollen are in little heads ranged in long spikes terminating the branches. These flowers produce only pollen. The female flowers which bear the seeds are found at the base of the spikes and lower down on the plant.

In the North the short ragweed begins to flower about the 10th of August, but in the South it is mostly about the 1st of September or later, depending upon how far South. Most ragweeds are short-day plants; it is the shortening of the days in late summer which provides them the stimulus to flower, so the farther South you go the later you will find them flowering, late in September in the Gulf states; but still farther South you pass a critical line where the common short ragweed is replaced by a slightly different form which does not respond to shortening days, but flowers as the plants

mature. In most of Florida one can find ragweed flowering at any time from May to late autumn. And this is probably why ragweed is much less important in Florida than elsewhere; the Florida ragweeds spread their effort over nine or ten months instead of concentrating it into six weeks or two months as they do farther North.

Short ragweed is an annual and a pioneer. Throughout most of its range it grows only in disturbed soil. It is the inevitable concomitant of dump heaps, excavations, abandoned and denuded soil.

Tall ragweed is much like the short, but the plant is generally bigger and its leaves less divided, cut into five or three lobes, or undivided. It produces a great deal more pollen per plant, but there is reason to believe that this is less toxic. The plant has similar habits of growth, but is less hardy than the short and is less tolerant of drought. It has almost as wide a range, but is not found in southern Georgia and Florida. In the western part of its range, Texas, Louisiana and Mississippi, it is replaced by a slightly different form called the Western Giant ragweed. This form is so similar that some botanists do not accept it as a different species; others admit it as a variety. I believe this middle course is about right. It differs from the Eastern form in being taller, often reaching twenty feet. Both varieties are annuals in the sense that it takes but a year to complete their life cycle. But the Western variety often sprouts from its seeds late in summer, winters over and flowers next fall. This extra growing time perhaps accounts for its great size.

Southern ragweed is the least important of the common ragweeds. It is found only in the lower Mississippi Valley, part of Texas and Oklahoma. It is an annual, but smaller and is probably little more than a minor contributory factor in hay fever.

Western or perennial ragweed differs from the others in being perennial. Otherwise it bears a close resemblance to the common Eastern species and grows in similar places. It is the principle ragweed west of the Rocky Mountains, but its range extends eastward to the Mississippi River, and it is common in Arkansas and Oklahoma. But it is much less important in hay fever than the tall and short Eastern species.

Prairie ragweed is a good deal like the true ragweeds in habit and appearance, and it is one of the most important hay fever plants in the prairie regions. It is reported from Memphis and is common in Oklahoma and Missouri. It is often called burweed marshelder, but it is not a marsh elder and does not grow in marshes; it flourishes in the dry prairie regions.

Rough marshelder is also a good deal like ragweed. It really is a marsh elder and grows in moist places. It is abundant in the south central states, and is almost as bad a cause of hay fever in Louisiana as ragweed.

There is another marshelder which grows along the coast and tidal marshes, but because of this it is of only local importance.

Cockleburs shed pollen which is just like that of ragweed, but it is much less prolific and the plants are usually less abundant, so they are only of minor importance. The cockleburs have similar habits to the ragweeds, growing in disturbed soil, and they are found throughout the country, not always the same species, because there are several, but it is difficult and scarcely necessary to distinguish them from each other.

GRASSES

The two outstanding grasses of the South are Bermuda grass and Johnson grass.

Bermuda is the commonest grass in the South and the most important in hay fever. It is too well known to deserve description. Nobody knows where it came from. Some say that it was introduced into America by the early settlers from the Mediterranean region where it grows abundantly; others that it came from India, where it is also found abundantly. And still others say that it is native of the West Indies and possibly along the Gulf Coast of continental America. But, whether or not it is native of America, its extensive distribution throughout the South is a recent development and the result of human activity, and it is likely to become even more abundant because it is a useful soil binder. Indeed, it is one of the most useful weapons in the hands of the Soil Conservation Service in the combat against soil erosion, and Government workers are not likely to let a little hay fever prevent them from using it. There is no single substitute for Bermuda grass because it grows in practically all soils, wet and dry, and even salty, so that many different grasses would be required to take its place. Its adaptability accounts for its enormous distribution which sweeps around the globe throughout its warmer regions.

Johnson grass is generally rated second to Bermuda grass as a cause of hay fever, but I believe it is a long second. It was introduced

into this country from Turkey. It, too, is a valuable grass in soil conservation and is likely to become much more abundant by intention if not by accident.

The other important grasses are really more characteristic of the North, but extend part way into the South.

Orchard grass is among the most important of these. It is certainly one of the worst hay fever grasses in Baltimore and the Middle Atlantic states. It is also important in Tennessee, but does not reach effectively much farther south.

June grass or Kentucky blue grass is in the same category. In the northern part of the southern area it is among the most important grasses, but does not reach effectively much south of Tennessee.

Besides these, Dallis grass, carpet grass, St. Augustine grass and many others probably all contribute each a small share of pollen, but in the aggregate quite large.

THE AMARANTH FAMILY

The Amaranth family contains a number of hay fever plants. They are all closely related and it has been shown that their pollens all interreact more or less perfectly, so that where several of them occur their effects are additive.

Western waterhemp is probably the most important of the group. It is counted as one of the most important hay fever plants of Oklahoma and parts of the adjoining states. This weed is rather exceptional in the family in that the plants are of two sexes. It produces enormous quantities of pollen which is very light and easily blown about. But the plants grow only in moist places.

Spiny amaranth is similar in appearance, but is a weed of waste places. It grows all through the South and where it is abundant it may be a contributing factor of some importance, but it does not shed as much pollen as the Western waterhemp.

Pigweed is similar in appearance, also a pioneer weed of waste places. It is more abundant and more widespread than either of the preceding species, but it is less important because it sheds only meager amounts of pollen.

THE PLANTAIN FAMILY

The plantain family is a large group of weeds, but only two are found in abundance in the South, and only one of these, the English plantain, causes hay fever. It is a perennial weed of waste places, impoverished soils and poorly cultivated ground. It sheds large quantities of pollen, but the plants are seldom abundant enough to be really important.

TREES

A great many trees cause a little hay fever. In fact, almost any tree that is wind pollinated can occasionally cause hay fever. So there are far too many for us to examine them all, and we will have to confine our attention to a few.

Texas mountain cedar is one of the most important. It is confined to the limestone ridges in Texas, principally the Edwards plateau. It flowers in winter, December to February or March, shedding enormous quantities of pollen.

Hay fever from this tree is entirely a man-made catastrophe. In the early days of "free range" it was not abundant enough to cause any trouble. But owing to over-grazing erosion was started on the hills. The erosion of the good black soil has exposed more of the underlying limestone, and the destruction of the competing vegetation by grazing permitted a greater growth of the mountain cedar. For many years it was suppressed by burning, which further increased the erosion. With the transition from ranching to farming the burning had to be discontinued on account of the wooden fences and farm buildings, so now the cedar has its own way, and we have to pay for the misdeeds of those who went before.

Pecan is another of the most important hay fever trees. It flowers in April and May, shedding huge quantities of pollen. It is found throughout the South, and in regions where it is cultivated in orchards it naturally produces too much pollen, for it was designed by nature to grow in mixed forest. So here again pecan hay fever is a man-made disease. But in this case there is some excuse; its edible nuts more than offset the trouble its pollen causes.

Pecan is a hickory. There are four or five others. All are so closely related that their pollens interreact perfectly, but the others still grow as individuals in a mixed and declining forest, so they are of little consequence in hay fever.

The Elms.—White elm, where it is used as a street tree, claims a few victims. Cork elm, winged elm and Chinese elm, and even occasionally the introduced English elm, may also contribute to early spring hay fever. More important in some localities are the late-flowering elms, the September elm in Tennessee, Georgia and Alabama, and the cedar elm in eastern Texas and adjoining states. These flower at

about the same time as the ragweeds and sometimes complicate the late summer hay fever.

Hackberry is related to the elms and is often used as a street tree, particularly in Florida, where it has been known to cause hay fever.

Paper mulberry has been shown by Dr. Bernton to be important in the District of Columbia, and other investigators have reported cases of hay fever from its pollen in various places. It sheds large quantities of unusually buoyant pollen. The true mulberries, which are closely related to paper mulberry, are also occasionally important. So, also, the Ossage orange, especially since their pollens interreact with that of paper mulberry. In some places all three of these acting together have been known to cause severe cases of hay fever.

Oaks.—There are about thirty species of oak in the Southern states. The live oak, red oak, laurel oak, water oak and black oak are all common street trees and their pollen is responsible for almost as much hay fever as that of any other trees. It is surprising that it is not even more important, for the oaks are enormous pollen shedders and the pollen usually outnumbers all others caught on the slides and is generally several times as much as that of ragweed.

Poplars are favorite street trees and are certainly responsible for some hay fever. The white poplar, necklace poplar and balsam poplar are all common street trees.

Box elder, where it is used as a street tree, sometimes causes hay fever. It really is a maple, but differs from all other maples in being entirely wind pollinated. Other maples are mostly insect pollinated, so are of no importance.

POLLEN

One way to find out which kinds of pollen are causing hay fever in any given region is to expose atmospheric pollen slides. The slides for this purpose should have a spot about 18 mm. in diameter covered with some kind of adhesive. The best is glycerine jelly containing basic fuchsin to stain the grains and make them easily recognizable. To prepare it ordinary commercial glycerine jelly is melted over a water bath, enough of the dye added to make it about the color of red ink. This is then painted over a circular area 18 mm. in diameter in the middle of the slide by means of a small camel hair brush. This layer must be very thin. If one has a slide turntable it is easy to get the right thickness and have the slides uniform. The slide is then exposed for 24 hours out of doors under some kind of a shelter to keep off sun and rain. After exposure it is brought in and examined with a hand lens to be sure that there is no sand or large particles caught in the jelly. A number zero cover glass, 18 mm. in diameter, is placed over the amount. The slide is then ready for examination.

Some investigators prefer to use vaseline as the adhesive. Indeed, this is to be preferred if the weather is damp, because glycerine jelly is easily spoiled by moisture. But vaseline must be used most sparingly. A little cotton is twisted tightly around a tooth pick, touched to the surface of the vaseline. That which is picked up should be worked into the cotton until it will just deliver a thin smear on the glass. Then it is spun onto the center of the slide as in the case of the jelly. It is most important that the vaseline be kept thin, otherwise its presence in the finished slide renders identification impossible. After exposure a small drop of a mixture of water, glycerine and alcohol, colored as dark as red ink with basic fuchsin, is added. The slide is then warmed over a flame and the drop spread over the greased area with a tooth pick and covered with a number zero cover glass. These slides, unless too much vaseline was used, are as good for observation as the others, but they cannot be transported and their use is awkward with oil immersion lenses.

In counting the pollen grains all under the 18 mm. cover are included. A low magnification is used, 100-150 diameters. By means of a mechanical stage the slide is traversed from side to side, covering a strip one field wide with each excursion, until the whole area is covered. Whenever a grain is encountered which cannot be recognized a high power objective is swung in, the identification made, and the low objective replaced. For indentification an oil immersion lens is necessary with a magnification of 60 to 90 x. But if one is using glycerine slides without jelly a 4 mm. apochromat with a magnification of 40 x can be made to serve.

Accurate identification can be made only by comparison with mounted specimens of known species of pollen. For this purpose one should provide himself with a reference collection of all the different kinds of wind pollen of the region and as many as possible of the insect pollens. Generally this will not exceed 40 or 50 species, and it is not difficult to make such a collection.

THE POLLEN GRAINS

Plants can be identified by their pollen grains, but not always to the exact species, because those that are closely related look almost exactly alike. Moreover, as with the flowers, those pollen grains which are insect borne are generally ornate and elaborate, while those which are air borne are plain and simple, which is unfortunate because it makes the latter, in which we are most interested, the most difficult to tell apart. Nevertheless, one can generally tell the family and often the genus that even air borne pollen grains belong to. And this is usually enough if we know something about the vegetation all around where the pollen was caught, such as one can learn from a quick botanical survey. In this pollen grain identification is much like identifying plants by their leaves, or trees by their bark alone.

Composite Family.—The pollen grains of the composite family are characterized by their sharp spines. That of sunflower may be taken as typical. It is a medium sized grain, nearly spherical in form and provided with three meridionally arranged furrows which open and close something like an eye, in response to changes in the moisture content of the grain. When open, right in the middle of each furrow, as if it were the pupil of the eye, is seen a round germinal aperture. It is provided with two coats; the outer is thick and takes the dye deeply, including the spines, which are long and sharp, and radiating outward. The inner coat is thin and elastic and does not take the dye so it scarcely shows, except when it bulges slightly through the germinal aperture. All of these characters, except the spines, occur again and again in the pollen grains of many unrelated families. But the conical spines are almost exclusively the property of the composite family.

The grains of the ragweeds are in a general way similar to those of sunflower. But, conforming to the rule of simplicity for wind pollen, they have only short spines. This is true of all ragweeds, and in fact all of the ragweed group. Also among the ragweeds the furrows are short, so much so that they are generally described as pores. But they are true furrows and each has its little germinal pore like the pupil of an eye.

The grains of "prairie ragweed," which is not a true ragweed but only a member of the ragweed group, have long furrows; otherwise they are like those of the ragweeds. The grains of the three common ragweeds look almost exactly alike, but if you examine them carefully with an oil immersion lens they can just be told apart. The spines on the tall ragweed grains are slightly larger, sharper and fewer than those of the other two. The grains of the three species are not quite the same size. Though those of each vary a lot so that there is a good deal of overlapping, generally speaking those of the tall ragweed are the smallest, averaging about 15 microns in diameter, those of the short ragweed next, about 17 microns, and those of the Western ragweed about 20 microns. Also the grains of the latter often have four furrows, while three are almost universal among the others.

Cocklebur grains differ more widely than the others of the group; they are much larger, about 25 microns in diameter, and the spines reduced almost to the vanishing point.

Mugwort grains differ still more widely. But this is to be expected, since the mugworts are in a different group of the composite family. Their outer coat is very thick and smooth with the spines reduced almost beyond recognition, but their furrows are long and conspicuous.

The Grasses.—Grass pollen grains are all almost exactly alike, except for size. They are spheroidal and smooth except for a slight granular texture of the surface, and they are provided with a single small round germinal aperture with a little lid which closes it when the grain dries. This form is universal through the entire family, but is otherwise unique among pollen grains. In size they range from that of corn pollen grains, which are about 100 microns in diameter, to slightly smaller than that of Bermuda grass, which is about 26 microns in diameter. The grain of Johnson grass, though much smaller than that of corn, is well above the average. There are so many grasses and their grains are all so much alike that it is futile to attempt to distinguish them in making pollen counts. But if one knows which grasses are in flower near where the slides are exposed, a pretty good guess can generally be made.

Plantain pollen grains are simple spheres like those of the grasses, but have from 7 to 14 pores instead of the single one of the grasses, and their outer coats are much rougher.

The Amaranths and Chenopods, two very closely related families, have grains so similar that it is impossible to tell which are from which. These grains are nearly perfect spheres, as that of spiny amaranth for example. The outer coat is thick and granular, but it is cut through by a number of round germinal pores. Each of

these is crossed by a delicate membrane bearing a few flecks. The different species can sometimes be told apart by the size and number of these apertures and by the degree of clumping of the flecks on the pore membranes, as will be seen by comparing the grains of spiny amaranth, Russian thistle and Western waterhemp.

Tree Pollen.—Many pine pollen grains are always caught on the slides because the pines are most prolific pollen shedders and their grains are carried great distances by air currents. Though they are harmless in hay fever, they are interesting. They are easily recognized by their two great bladders, borne on the ventral side of the grain, each almost as big as the grain itself. It is these bladders which are believed to give the grains the buoyancy which results in their phenomenal flights. Pine pollen is recorded in quantity in the bogs of Greenland, though the nearest pine trees are 600 miles away in Labrador.

Though mountain cedar is related to the pines, its grains bear them no resemblance, but this is mainly because they have no bladders. They are simple spheres, without pores or furrows, just a few flecks on their surface.

Birch grains are flattened and triangular in outline, but quite smooth and unadorned except for their three pores, one at each angle. The grains of all the birch family such as the hazel, ironwood and hop hornbeam, are so much like this that it is extremely difficult to tell them apart. But those of alder, which also belongs to the birch family, are four or five angled with four or five pores, each surrounded by a thickening in the outer coat, which gives off long curving processes joining to the next pore around the grain. So alder grains are always easily recognized, and their flattened angular shape with a pore at each angle stamps them as belonging to the birch family, even if one did not already know this.

Mulberry grains are similar to those of birch, but have only two pores, something which appears not to occur among the birches. The grains of paper mulberry are just the same, but much smaller. Their extreme minuteness gives the pollen great buoyancy so that as it is shed it floats away life puffs of smoke. The trees have even been described as "smoking" when they shed their pollen.

Elm pollen grains are flattened and with four or five elliptical pores zigzagging around the equator. Their outer coat is thick and ripple marked. When properly stained the ripple marks are quite striking so that there is no mistaking the grains for anything else. But they must be stained to show these identification marks.

Oak grains are caught on the slides in enormous numbers, frequently outnumbering all others put together. They are always easily recognized by their thick warty coats and three, or sometimes four, furrows which gape widely open when the grains are expanded in glycerine jelly, allowing the contents to bulge through. The grains of all the numerous species of oak are so much alike that it is impossible to tell them apart. But the different species do not all flower at exactly the same time so, from the botanical survey, one can generally tell pretty well which oaks are responsible for the pollen which is caught.

Pecan is a large flattened and triangular grain, at first sight looking something like that of birch, but its three pores are not exactly at the angles. Instead they are a little above, or below the angles, according to which you regard as the top of the grain. In other words, they are all in the same hemisphere. And the outer coat of this hemisphere is thicker than that of the opposite. Pecan is a hickory and the grains of all the hickories are exactly like this.

The one-sidedness of the pores of the hickory grains is a family character, for the grains of the walnuts, which belong to this family, also have their pores all in the same hemisphere, but they have many more, usually about twelve pores.

The grains of maple resemble those of the oak in their three large germinal furrows, but their outer coat is granular instead of warty. In the grains of most maples the granules are arranged in striae resembling thumb prints, but in those of box elder, which is a wind pollinated maple, they are unorganized.

The grains of poplar or cottonwood are simple spheres without furrows or pores. But they may be recognized by their thin and even fragmentary exine. As a sort of compensation for its scanty outer coat the inner transparent coat is more than usually thick.

Of course many other pollen grains are caught on the slides. But a knowledge of the characteristics of the grains of the various plant families will often enable one to assign the unknowns to their proper families, and identification can be made by reference to the specimen collection which one must always keep at hand.

CONCLUSION

The problem of hay fever is botanical as well as clinical. The clinical deals with the cure of hay fever, the botanical with its prevention. We have a good cure for hay fever, but scarcely a thing has been done towards its prevention. This is an earnest plea for a further study of the atmospheric pollen in all the hay fever regions, and a study of the habits of the plants which produce it, so that we may take intelligent action towards the prevention of hay fever.

Arlington Chemical Company

SULFATHIAZOLE AND SULFAPYRIDINE THERAPY IN URINARY TRACT INFECTIONS*

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and
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Radical changes in the treatment of urinary tract infections demand the attention of all physicians. During the last three years we and others have discussed the treatment of nonspecific urinary tract infection with sulfanilamide, sulfanilyl-sulfanilamide and sulfapyridine. We now have for appraisal another sulfonamide derivative, namely sulfathiazole. As a therapeutic agent, it must be compared with its predecessors.

Before serious clinical consideration be given a new sulfonamide drug, it must be proven to have a higher therapeutic index, lower toxicity and greater bactericidal action for organisms previously resistant. It has been well established by Barlow, Helmholtz,[1] Herrold and Brown,[2] Long,[3] Hill,[4] Lawrence,[5] and Rammelkomp and Keefer,[6] that sulfathiazole and its methyl and phenol derivatives have a higher therapeutic index than sulfapyridine and sulfanilamide for staphylococcus, Streptococcus fecalis, and pneumococcus infections. It has also been pointed out by Long,[3 7 8] Spink,[9] and others that sulfathiazole is less toxic for man than is either sulfanilamide or sulfapyridine. The introduction of the phenol and methyl groups raises the toxicity. Long has shown that with some animals, as, for instance, in mice, rats or monkeys, it may have a higher toxicity. This is probably related to the rapidity of absorption and excretion in these animals. Sulfathiazole conjugates into the free and the acetyl derivatives in the same manner as do sulfanilamide and sulfapyridine, but to a lesser extent. Deposition of sulfonamide crystals occasionally occurs. Sulfapyridine crystals are usually deposited in the extrarenal urinary passages, the pelvis and ureter, whereas sulfathiazole crystals, as reported by Pepper and Horack,[10] Spink,[9] and Knoll and Cooper,[11] are usually found in the collecting tubules. Daily examination of the urines of patients receiving these drugs will show the crystals, and early and serious complications may thus be prevented. It is believed that crystals appear only when the patients are subjected to large doses of the drug and fluids are restricted. For this reason some danger is encountered in obtaining high blood and urine concentrations with sulfathiazole or sulfapyridine. Fluids should not be restricted but rather forced to prevent this complication. There have also been reports of hematuria and anuria from the use of large doses of these drugs. Blood dyscrasias, similar to those seen in sulfanilamide and sulfapyridine therapy have been noted, but they are rare. None of these serious complications has been encountered in our patients receiving the small dosage here recommended. Nausea and vomiting are much less frequently seen than with sulfapyridine therapy. Other toxic manifestations, such as dizziness, headache, and general malaise, are mild. Skin rash and conjunctivitis are encountered perhaps a little more frequently with this drug than with sulfapyridine. It is possible also to have nerve tissue injury as with sulfanilamide, sulfanilyl-sulfanilamide, and sulfapyridine, but no cases of peripheral neuritis have been reported. The incidence of peripheral neuritis following the use of sulfamethyl-thiazole on the other hand is high and its use is not recommended.

Investigation of the absorption and excretion of these sulfonamide drugs has been discussed at some length in previous papers.[12 13] Sulfathiazole and sulfanilamide are more rapidly absorbed than sulfapyridine. Sulfathiazole is excreted far more rapidly than the others. Hence, it is difficult to maintain a high blood level unless the drug is given in large doses and at frequent intervals, as shown by Long.[3 7 8] Diminished renal function causes a delay in its excre-

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tion. We have shown in previous communications that the sulfonamide excretion curve follows the blood concentration curve when renal function is normal. However, when renal function is abnormal the curves do not follow each other; the blood curve is higher and the excretion curve lower (*Fig. 1*). We have also demonstrated that in unilateral kidney disease the drug excretion from both the good and the bad kidney follows its corresponding 'phthalein excretion (*Fig. 2*). This is also true of sulfathiazole. A patient whose 'phthalein excretion was 30 per cent from the left kidney and 2.5 per cent from the right kidney was given a single dose of 3 grams of sulfathiazole. His blood concentration was determined in hourly collections. His urine from both the right and left kidney was collected through ureteral catheters every hour and sulfathiazole determinations were made on each sample (*Fig. 3*). The drug curves show that the excretion from the good or the left kidney follows the blood curve, while the excretion from the poor kidney does not. The good kidney excreted 2,024 milligrams in seven hours, whereas the poor kidney excreted only 211 milligrams. This demonstrates an output in seven hours of 71 per cent of the sulfathiazole ingested. Elimination, therefore, is much more rapid than with either sulfapyridine or sulfanilamide. It also shows that sulfathiazole excretion follows the 'phthalein. *Fig. 4* represents a patient with two bad kidneys, the right having only 10 per cent 'phthalein excretion in thirty minutes and the left only 4 per cent. In this individual we see a higher blood curve and lower excretion curve than is found in the normal patient. Approximately 700 milligrams were excreted in seven hours as compared with 2,000 milligrams in the previous case.

Having established the fact that there is very little of the drug excreted from a badly damaged kidney we were anxious to learn what percentage concentration could be obtained from a poor kidney. A patient with 30 per cent 'phthalein in thirty minutes from one kidney and just a trace from the other showed that each kidney excreted an amount of the drug comparable to its 'phthalein elimination. It is also evident that the good kidney attained a much higher concentration of the drug, 90 milligrams per cent in the fourth hour period, as compared with 20 milligrams per cent concentration from the poor kidney. The maximum concentration from the poor kidney was 25 milligrams per cent in the sixth hour period. Considering the small amount of the drug excreted from the poor kidney the concentration seems to be fairly good. In another patient who had bilateral cutaneous ureterostomy, we were able to make similar tests. In addition to collecting the specimen for concentration and drug output, cultures were

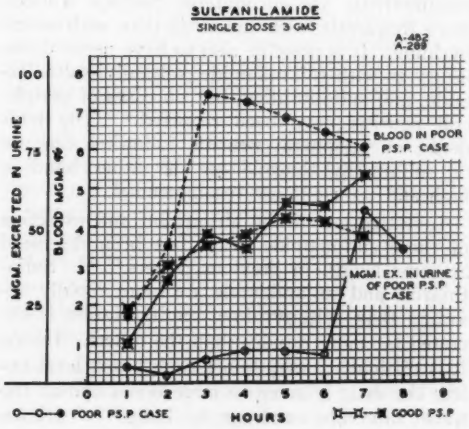

Fig. 1

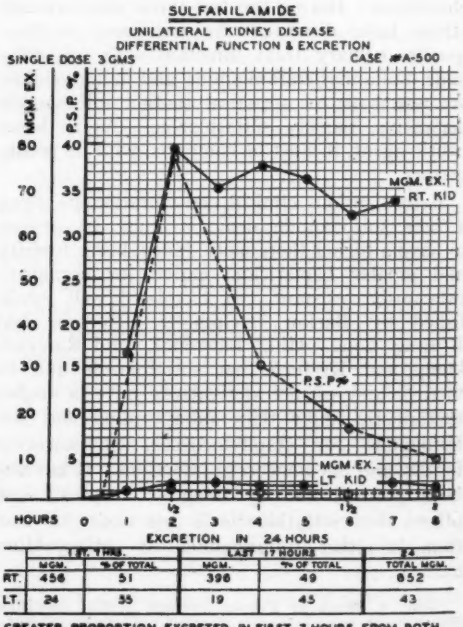

Fig. 2

taken every hour to determine at what drug concentration level the urine became sterile. However, because of extraneous bacterial contamination the test was unsatisfactory. This individual has one kidney with 20 per cent 'phthalein excretion in a half hour and the other kidney excretes 2.5 per cent during the same period. It is evident here too that the good kidney eliminates by far the greater part of the drug and also attains a higher concentration, 25 milligrams per cent. The poor kidney excretes much less of the drug and attains a concentration of 15 milligrams per cent. It is rather interesting that the latter kidney, while excreting little of the drug, is able to attain a concentration higher in proportion than one might expect. Further investigation along this line is being carried out at present.

Bacteriologic studies *in vitro* are most important in evaluation of a new drug. Many reports on sulfathiazole have been made. It is thoroughly established that sulfathiazole is bactericidal for colon bacillus, Streptococcus fecalis, pyocyaneus, proteus bacillus and staphylococcus. Attempts have been made to find definite bacteriostatic drug levels for each specific kind of bacterium. It has also been suggested that the bactericidal activity of the sulfonamide drugs may vary according to the hydrogen ion concentration, or pH, of the urine. With sulfanilamide and sulfapyridine this does not seem to be a factor. Recently Helmholtz[14] reported that the bacteriostatic activity of sulfonamide in some infections varies with the pH. An alkaline or high pH is preferable for staphylococcus and proteus infections, while a low or acid pH is preferred for Streptococcus fecalis; for pyocyaneus and aerobacter there is little difference between the high and low pH urine. He furthermore showed that in a test tube a concentration of 50 milligrams per cent at any pH will kill most of the staphylococci and that a concentration of 150 milligrams per cent is bactericidal for most proteus infections. Ninety-six per cent of Escherichia coli are killed with 200 milligrams per cent and

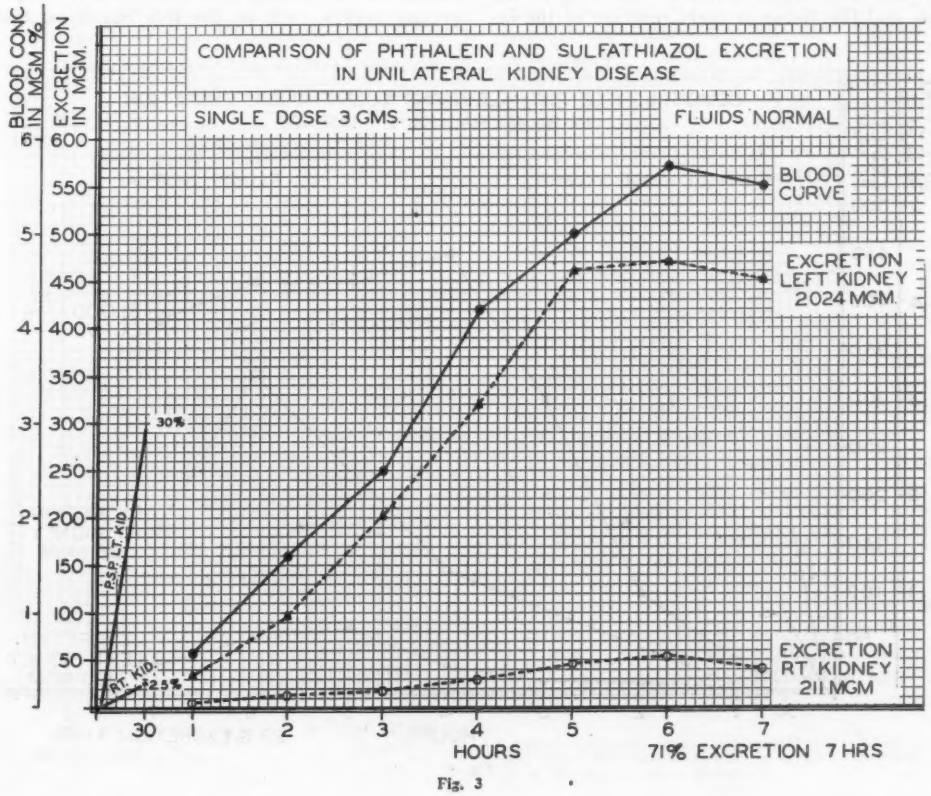

Fig. 3

60 per cent with 25 milligrams per cent at any pH. Streptococcus fecalis required a much higher concentration of 300 milligrams per cent to render the urine bactericidal. He concluded that the question of advisability of having a high or low pH with sulfathiazole depended upon the particular organisms encountered. It has been shown by Neter that a concentration of 100 milligrams per cent exerts a definite bacteriostatic action for Streptococcus fecalis, particularly when the temperature is raised to 43 degrees Centigrade. It has been established both clinically and experimentally that the bactericidal power of the sulfonamide drugs is increased by the addition of hyperthermia.

Bacteriologic studies *in vitro* are, of course, very important in guiding our clinical application of these new drugs. However, conclusions drawn from the experimental work *in vitro* are not necessarily entirely comparable *in vivo*. Particularly is this true in the treatment of urinary tract infection, inasmuch as we have to consider both the bactericidal action of the drug in the urine and the tissue or body reaction of the individual. The specificity of these various drugs for certain bacteria and indeed for particular strains of the same bacterium is quite evident. It is essential for us to know with what particular bacterium we are dealing if we are going to treat these patients intelligently. It has been pointed out previously by us and others that sulfanilamide is bactericidal for hemolytic streptococcus, most of the strains of B. coli, and proteus bacillus, but for only a few strains of staphyloccoci and Streptococcus fecalis. Sulfathiazole, in contrast, has a higher therapeutic index against staphylococcus and Streptococcus fecalis. Only a few authors have reported sulfathiazole treatment of urinary tract infection and in none of these was the particular bacterium specified. Hence evaluation is difficult. De Eds[15] working with phenolthiazine in a series of 49 cases reported cures in all but eight; Stirling[16] reports eight cures in ten patients; Poole and Cook[17] report 65 per cent cured of fifteen patients with colon bacillus infection, seven with Streptococcus fecalis and five with Staphylococcus aureus. All of the five Staphylococcus

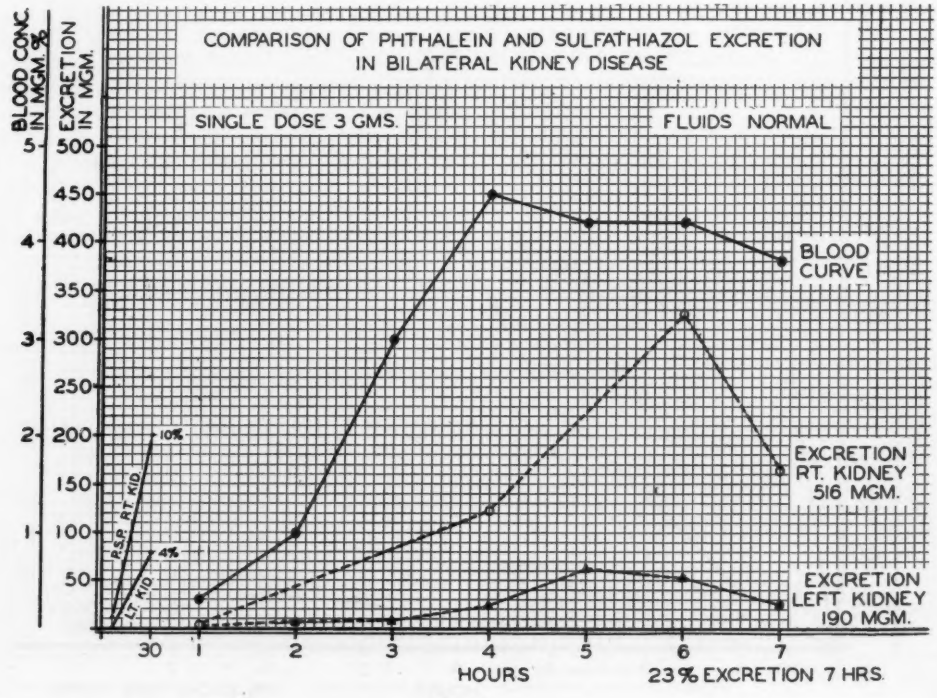

Fig. 4

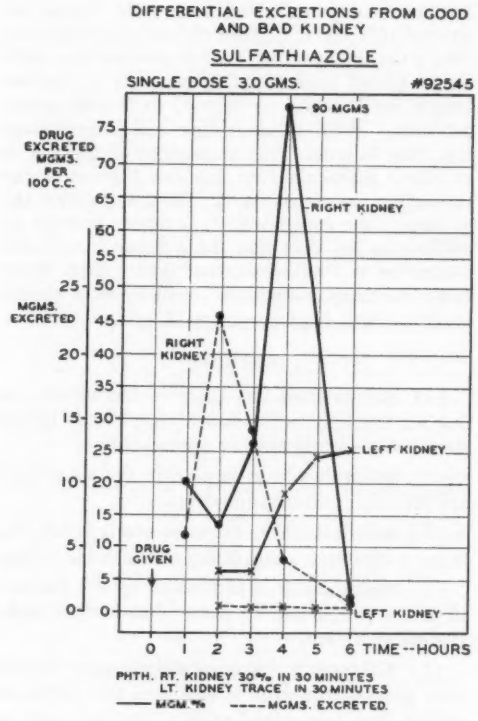

Fig. 5

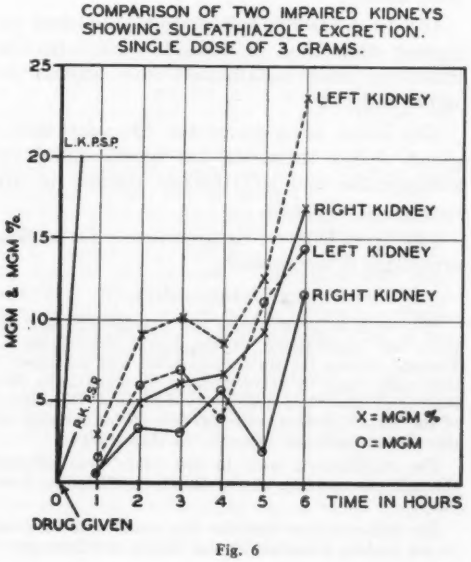

Fig. 6

aureus infections were cured. Spink and Hansen[9] had twenty and Culp[18] twenty-four patients and both reported 65 per cent cured.

In carrying out this study we have hospitalized* 250 patients so that very careful clinical, biochemical, and bacteriologic observations could be made. Catheterized urine was obtained in females and a three-glass test used in males. Smears and stains were examined daily. Cultures were taken frequently and blood and urine concentrations determined twice a week. Criteria for cure are repeated negative smears and stains of centrifuged specimens and negative bacteriologic cultures. Our results with this therapy have been reported recently.[13] All of these cases were uncomplicated. Each had a complete urologic work-up, including pyelograms, so that we were sure that there was no obstructive or other pathologic condition present. Sulfanilamide therapy rendered 80.6 per cent cured for colon bacillus and 62.5 per cent cured for staphylococcus. There are 47 cases treated with sulfapyridine; 86.2 per cent of the colon bacillus and 75 per cent of the staphylococcus infections were cured. There are 53 cases treated with sulfathiazole. In this group 75 per cent of the colon bacillus and 87.5 per cent of the staphylococcus infections were cured. This shows a higher percentage of staphylococcus cures than was obtained with either of the other drugs, but a lower percentage of colon bacillus cures than was obtained with either sulfanilamide or sulfapyridine. A review of the series shows: sulfanilamide cured 80.6 per cent of colon bacillus and 62.5 per cent of staphylococcus infections; sulfapyridine cured 86.2 per cent of colon bacillus and 75 per cent of staphylococcus infections; sulfathiazole cured 75 per cent of colon bacillus and 87.5 per cent of staphylococcus infections. In the treatment of urinary tract infections, therefore, we select the drug most bactericidal for the particular type of infection present.

We[13] have previously reported that it is unnecessary to have either a high blood level or a high drug concentration in the urine to effect a cure of urinary tract infections. There are others who differ with us on this point. They believe that the urine concentration is the most important factor and that resistant cases may be cured by raising the drug level. We have not found this to be true in our series; no failure was cured by raising the dosage of the same drug.

*Since reading this paper this series has been increased to almost 400 cases. The various statistical percentages of results remain about the same as reported here.

Several years ago we showed that in gonorrheal infection high blood levels were not necessary for cures. This has been repeatedly proven since then with all the sulfonamide drugs. We have shown in the case of urinary tract infection that approximately the same results are obtained if 3 grams a day are given with fluid intake restricted to 1,200 c. c., thus obtaining a high concentration in the urine, or 1.8 grams a day with fluids forced to 4,000 c.c., securing a concentration in the urine of only 30 to 50 milligrams per cent. With sulfapyridine and sulfathiazole the same is true. Our usual plan of therapy is to give 3 grams the first day and 2 grams a day thereafter for seven days. On this regime the average urine concentration is approximately 35 milligrams per cent and the average blood concentration is 2 milligrams per cent. After seven days the drug is stopped. Sometimes a second similar course is given one week later.

SULFANILAMIDE THERAPY
UNCOMPLICATED CASES

Bacteria	Cases	Per Cent Well	Per Cent Imp.	Per Cent Unimp.
Colon bacillus	67	80.6	16.4	3
Staphylococcus	8	62.5	37.5	0
Mixed	10	20.0	80.0	0

Table 1

SULFAPYRIDINE
UNCOMPLICATED CASES

Bacteria	No. Cases	Per Cent Well	Per Cent Imp.	Per Cent Unimp.
Colon bacillus	29	86.2	10.3	3.5
Staphylococcus	12	75	16.7	8.3
Mixed	6	50	50	—

Table 2

SULFATHIAZOLE, 2 GM. Q. D.
UNCOMPLICATED CASES

Bacteria	No. Cases	Per Cent Well	Per Cent Imp.	Per Cent Unimp.
Colon bacillus	16	75	25	—
Staphylococcus	24	87.5	6.25	6.25
Mixed	13	47	53	—

Average—Urine conc.	36 mgm. per cent
Average—Blood conc.	2.1 mgm. per cent

Table 3

COMPARISON OF RESULTS WITH DIFFERENT DRUGS
PER CENT CURED

Bacteria	Sulfanilamide	Sulfapyridine	Sulfathiazole
Colon bacillus	80.6	86.2	75
Staphylococcus	62.5	75	87.5
Mixed	20	50	47

Table 4

SUMMARY

(1) Sulfathiazole has a higher therapeutic index for staphylococcus and Streptococcus fecalis than has sulfanilamide or sulfapyridine.

(2) Sulfathiazole is less toxic for man than are the other sulfonamide drugs.

(3) Sulfathiazole is excreted much faster and more completely than other sulfonamide drugs.

(4) Sulfathiazole is eliminated by the kidneys in direct proportion to their phenolsulphonephthalein excretion.

(5) Although a damaged kidney may excrete very little of the drug it attains a concentration higher than one might expect. It does not attain, however, a concentration as high as the good kidney.

(6) In our series sulfapyridine produced the highest percentage of cures for colon bacillus infections, and sulfathiazole the highest for staphylococcus.

(7) Doses of 3 grams the first day and 2 grams a day thereafter are recommended for sulfapyridine and sulfathiazole therapy in urinary tract infections.

(8) Specificity of drug response for various organisms is emphasized.

ACKNOWLEDGMENTS

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The sulfathiazole used in this study was obtained through the courtesy of the Winthrop Chemical Company.

The sulfapyridine used for this study was furnished by the Lederle Laboratories and Merck and Company.

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DISCUSSION (*Abstract*)

Dr. Ray M. Bobbitt, Huntington, W. Va.—The excretion curve in good and impaired kidneys brought out in this paper explains why in cases with badly impaired kidneys proper results are not obtained. We certainly agree that nothing is gained by increasing the dose and blood concentration in cases that do not respond. Usually if results are to be obtained with this group of drugs, they are prompt.

We have come to the conclusion that sulfathiazole is just as efficient as either sulfanilamide or sulfapyridine in colon bacillus infections, and this is particularly true if this organism is associated with other organisms. We believe now that all staphylococcus infections should be treated with sulfathiazole, although many of our cases responded to the other drugs in this group before sulfathiazole was perfected.

Our experience in gonorrhea conforms to the preliminary report made by Ballenger and McDonald that sulfathiazole is the superior drug. In fact, we have had only one recurrence in the few weeks we have been using it.

We have been particularly pleased with results in preoperative and postoperative use of these drugs in infected cases. This applies especially to prostatic surgery, in which the preoperative preparation and postoperative care have been much shortened and the patients made more comfortable.

I was rather surprised to hear Dr. Dorman say yesterday he did not use any of the sulfanilamide derivatives preoperatively. Realizing the fact that, of course, it does depress the blood, I have not been able to understand why he made that statement. I hope it will be brought out in the discussion.

We use it routinely and we believe it helps prepare our patients. In the matter of postoperative care, I remember most distinctly a patient who, just after having a prostatectomy, continued to have frequency, bleeding, pain and discomfort, and no residual urine. He had a chronic posterior urethral bladder without the usual findings. We had given him all the drugs up to the time sulfathiazole came along, and his urine stayed cloudy. He had a mixed infection, colon streptococcus and staphylococcus. After forty-eight hours of this drug his urine was clear and he was symptom-free.

Our experiences with sulfathiazole in staphylococcus blood stream infections were very similar to those reported recently by Calhoun Stirling. Some of them have been spectacular.

I would like to ask Dr. Alyea one question: just how important he thinks it is to keep his blood concentrations and laboratory work on those cases. Many men have not available the splendid laboratory procedures that, of course, they have in some of the teaching hospitals.

We have worked it out pretty carefully to start with, but we do not run them on every single case. I wonder if he thinks it is really important.

Dr. Grayson Carroll, St. Louis, Mo.—Dr. Alyea is to be commended for his splendid presentation. Our laboratory and clinical experiences, except in minor details, give the same results as expressed by him. Episcleritis, giving a red, fan-like appearance at the outer commissure of the eye, is not an uncommon complication of sulfathiazole and is apparently harmless and disappears within forty-eight hours after the medication is discontinued. This chemical reaction should not be diagnosed as an infection.

The appearance of sulfathiazole particles, as well as the acetylated form in the tubules of the kidney, is in contrast to the appearance of concretions as seen in sulfapyridine. The former calls for forced fluid, 1,500 c. c. of glucose intravenously, and discontinuing the drug; whereas, the latter calls for cystoscopic lavage with sterile water 110 degrees.

The sodium salt intravenously should be resorted to when the blood concentration is low and the patient is not doing well. If the sodium salt is not available, the oral dose should be greater, provided the urine does not show a saturation of crystals. The rapid elimination of this drug in some individuals requires larger and more frequent dosage to maintain the proper blood level to bring about recovery.

We have not found that sulfathiazole retards healing, but in infected wounds it promotes it. A pyonephrotic kidney may not be secreting urine heavily laden with sulfathiazole and yet therapeutic results may be obtained through the blood stream. The sulfathiazole is slowly absorbed in the rectum and in the spinal fluid, the proportion being about one to four in relation to the blood. Therefore, sulfapyridine is the drug of choice in meningitis.

Dr. Lloyd G. Lewis, Baltimore, Md.—In the current *Journal of Urology*, Dr. Young has described the use of sulfathiazole for prevention of wound infection, particularly in hypospadias cases. In view of his work I used sulfathiazole in a recent case of hypospadias. This boy came to me having no previous operations. That is rare. I repaired the hypospadia from the penoscrotal juncture right through the glands and the urethra held it. There was a little skin break at the penoscrotal juncture and another skin break down at the frenum. Dr. Young advised giving sulfathiazole, which I gave to the boy, 9 years old, one-half gram three times a day.

The blood count at the second day was 4.5 milligrams. After six days both the skin wounds had completely healed. On the eighth day I was ready to discharge him. I pulled a sponge across and it caught on something toward the little opening on the skin and I extricated a pure sulfathiazole stone from this skin wound. There was no communication with the urinary tract at all. It is a rather interesting fact that sulfathiazole stone can form in an otherwise sterile wound.

Dr. Young has advised the use of sulfathiazole for prevention of operative wound infection, particularly in plastic operations upon the penis. I recently corrected an hypospadiac deformity at the penoscrotal juncture, using the Duplay technic. The urethra healed kindly, but there were two small skin separations. Sulfathiazole 0.5 gram t. i. d. was prescribed for a 9-year-old boy. Skin clips were used to relieve tension. These were removed after four days and there was apparent wound healing. When examining the patient before discharging him I noted a spicule of hard substance projecting from one of these skin defects. A pure sulfathiazole calculus 2 x 2 x 1 mm. was removed. The skin closed perfectly in three days.

Dr. Edgar G. Ballenger, Atlanta, Ga.—Sulfathiazole is effective in doses of moderate size; this quality makes it possible to administer effective doses with few toxic reactions.

The mass of infection as well as stagnant secretion play important parts in the control of inflammatory processes. For that reason it is desirable to keep tissues clear of debris, pus, stagnant urine or whatever else may harbor infection and hinder the bactericidal activity of sulfonamide preparations. For instance, in the treatment of urethritis the patient is instructed to urinate every hour during the day in order to keep the mucosa clean.

When the kidney function is poor the concentration of sulfonamide remedies in the blood stream is quickly obtained. Big doses therefore are not required for tissue infections. Much greater care is necessary in such instances in regulating the dosage. It is well to alternate from one drug to another until the most effective one is found. This usually will be sulfathiazole.

Dr. Alyea (closing).—I consider it unnecessary to get frequent blood and urine determinations during treatment of injections of sulfathiazole. This is difficult unless the patient is in a hospital equipped with a good chemical laboratory. We always get the estimations twice a week, because we are working on the subject from the experimental viewpoint. In practice, when you know the drug, the dosage used and the renal function of the patient, you can estimate fairly accurately what the blood and urine concentrations will be.

STATISTICS ON LOBAR PNEUMONIA*

By W. L. Cooke, M.D.
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In the last five years the treatment of the pneumonias has changed so much that it would seem of some value to compare the statistics and mortality.

MATERIAL

The Charleston, West Virginia, General Hospital is a volunteer hospital averaging around a hundred and ninety patients during this five-year period. The staff is open and the cases reviewed represent the patients of many different physicians. Charleston is located in the bituminous coal fields of West Virginia, and about two-thirds of the cases discussed represent contract cases from the mining camps. There is no full-time medical staff and the hospital has no connection with any teaching institution.

It seems advisable in preparing a statistical study to include only cases of lobar pneumonia. Bronchial pneumonia is often of mild nature or a secondary complication of some other disease, so that it does not lend itself well to a study of this kind.

RESULTS

In the five years from 1936 to 1940, inclusive, there were 374 cases of lobar pneumonia admitted to the hospital. Lobar consolidation was confirmed by roentgenogram in 335 cases. Following is a table showing the number of cases and mortality by years:

MORTALITY

Year	Cases	Deaths	Mortality Per Cent
1936	96	26	27
1937	107	30	28
1938	78	16	20.5
1939	36	3	8.33
1940	57	3	5.26

Table 1

We began to use sulfapyridine in January, 1939; so that the last two years coincide ex-

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*From the Medical Service of the Charleston General Hospital, Charleston, West Virginia.

actly with sulfonamide treatment. Of the six deaths in these two years only one patient was in the hospital over 24 hours. He was a 67-year-old white male who had hypertensive cardiovascular disease. His son said that he had had a "stroke" one year previously and while not paralyzed, he definitely showed signs of cerebral malacia. Four of the patients who died within twenty-four hours had the following complications: (1) toxic myocarditis, (2) acute poliomyelitis, (3) chronic alcoholism, and (4) delirium tremens and fatty degeneration of the liver which was found at postmortem examination.

All cases treated in 1939 had sulfapyridine. In 1940, sixteen cases had sulfathiazole and thirty-seven cases sulfapyridine. Four cases were given no active treatment. The majority of adult patients received three grams of the sulfonamide on admission, followed by one gram every three hours. Naturally, with so many physicians involved, the dosage varied considerably. Only two cases received serum in addition to chemotherapy.

In 1936, pneumococcus typing was attempted in 32 per cent of the cases. As the use of serum became more prevalent, this ratio increased until 1939, when typing was attempted in over 91 per cent of the cases. In 1940, less than 74 per cent had a study made for pneumococcus type. This is shown in *Table 2*. Are we becoming careless of our type diagnosis as the mortality has dropped?

TYPING ATTEMPTED

Year	1936	1937	1938	1939	1940
Total cases	96	107	78	36	57
Cases typing attempted	31	67	59	33	42
Per cent typing attempted	32	63	75.6	91.6	73.7

Table 2

During these years the prevailing type varied. Type I pneumococcus predominated in 1936 and 1937; Type II has predominated since 1937. In all cases for which a type was secured, Type I was found in 21 per cent and Type II in 39 per cent. Other types occurred in numbers too small to be significant.

COMMENT

It is interesting to speculate as to why the number of cases of lobar pneumonia decreased in the last two years, while the general number of hospital admissions was increasing. Was the pneumonia milder? Did the results of home treatment improve with sulfonamides? Were the cases treated so successfully with sulfonamides that they did not progress to large areas of consolidation?

There is an apparent tendency to treat lobar pneumonia with less respect and in a severe virulent epidemic our results may not show a continued low mortality. Type studies must be continued to solve all the problems associated with the pneumonias.

CONCLUSION

As the treatment of lobar pneumonia has progressed, the mortality has been reduced from 27 per cent to 5.26 per cent during the five-year period from 1936 to 1940 at the Charleston General Hospital.

404 Brooks Street

MENINGITIS IN A NEWBORN DUE TO THE COLON BACILLUS*

REPORT OF A CASE WITH RECOVERY

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and

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Meningitis occurring in the newborn period (under one month), while rare, is most frequently caused by *B. coli communis*. Recovery of such a case treated with sulfonamides prompts this report. Rauch and Krinsky[1] reviewed the literature on this subject recently, reporting recovery of an infant similarly treated.

CASE REPORT

A. C., a white male infant, was born on August 9, 1940. An imperforate anus was corrected 48 hours later. At operation one-quarter inch separated the external canal from the *cul-de-sac* of the rectum. The sphincter functioned normally. Digital dilatation and massage were instituted immediately. The constricting portion was difficult to keep sufficiently dilated and bleeding usually followed each manipulation. However, the condition of the child was entirely satisfactory and the weight progress was normal. At the age of 3 weeks, while the constriction was being dilated, a small mass

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was felt to "give way." Four days later the infant's temperature began to rise and by the third day reached 102° F. There were no physical findings at this time to explain the fever, except a moderately reddened throat. The infant did not appear ill. On September 12, 1940, the patient was readmitted to the Children's Hospital. The white blood count was 17,000, polymorphonuclears 75 per cent, lymphocytes 21 per cent, eosinophiles 1 per cent, and monocytes 1 per cent. The urine was essentially negative. Empirically the patient was placed on sulfathiazole, one-third of a 7.7-grain tablet five times daily. This was continued the next five days, during which time there was a gradual decline in the temperature. On the fifth day after admission mild stupor was noted, as well as a definitely bulging fontanelle. There was no rise in temperature at this time and no neurologic signs were present except slight resistance to flexing the back. A lumbar puncture was done and 20 c. c. of slightly turbid fluid was removed under some increase in pressure. The fluid showed 960 cells, of which 85 per cent were polymorphonuclears, a normal reduction of Benedict's, and 90 mg. of protein. A spinal fluid sulfathiazole determination of this fluid revealed 3.2 mg. per 100 c. c. No organisms could be found on direct smear. Despite the absence of organisms sulfapyridine was substituted for sulfathiazole. This was done because our experience in the District of Columbia led us to believe that the influenza organism was the most probable agent of meningitis at this age.[2] The following day a gram-negative coccoid bacillus was found on smear from a second lumbar puncture. Thirty c. c. of Fothergill's anti-influenzal serum was given, one-half intravenously and one-half intramuscularly, and a transfusion of 75 c. c. of whole citrated blood. Before further serum was indicated a culture of the first spinal fluid showed a typical growth of *B. coli communis*. The temperature, which had begun to rise slightly, gradually declined to normal on the third day after beginning sulfapyridine. At this time marked diarrhea and abdominal distention with pain and extreme restlessness developed. Sulfapyridine was discontinued. A total of 51 grains (sulfapyridine) was given. It is interesting to note that the above gastro-intestinal symptoms subsided eight hours after the drug was discontinued. No organisms were found on smear of the spinal fluid on September 20 or 22, and culture of the fluid was sterile. A concentration of 12.8 mg. of sulfapyridine was present in the spinal fluid of September 20, the third day of medication. No further temperature rise occurred and the infant was discharged on September 24, 1940. At no time was this infant desperately ill except from the apparent effects of sulfapyridine. The infant on February 15, 1941, is nutritionally, mentally and neurologically on a par with infants of the same age. The partial constriction of the anal canal remains, but digital dilitation maintains a fairly normal daily evacuation.

COMMENT

The early diagnosis of meningitis in the newborn is infrequently made, with the result of a high mortality rate. Delayed diagnosis is apparently unavoidable since very few symptoms occur to direct one's attention to the central nervous system. Gibbens[3] reported three cases of *B. coli* meningitis. All died, only one being diagnosed during life. He points out that pressure signs are often absent and the bulging fontanelle occurs late, if at all. His explanations of this are:

> "Because of the anatomical condition within the skull, the immaturity and lack of differentiation of the brain of the new born, the rapidity with which pathologic changes in the nervous system of these infants take place, considerable expansion of the brain may take place before there is any evidence of intracranial pressure."

He believes also that one is dealing with signs and symptoms of irritation or paralysis of the medulla rather than localizing cortical or meningeal symptoms.

One case of meningitis (McLendon) was seen at the age of seven days and was due to the meningococcus. The only symptom was a fever of 102°. The patient recovered with the use of antimeningococcus serum. Another case at the age of 11 months, due to the Morgan bacillus,[4] had only fever and a bulging fontanelle as the presenting signs and never had signs referred to the central nervous system. A fatal case of meningitis, due to the Hemophilis influenzae, was seen by the authors at the age of 10 days with fever, cerebral cry, and cyanosis. A clinical diagnosis was made of intracranial hemorrhage. This was also the experience of Mulherne and Seelye[5] with a 5 weeks old infant whose case ended fatally after 3 weeks of illness.

Meningitis due to *B. coli communis* was recognized as early as 1895, when Schere[6] reported 3 cases in a series of 1,500 cases of meningitis in children. Holt,[7] in 1911, reported 1 case out of 300 in infants and children. Neal[8] reported in 1926 1,500 cases of meningitis of all ages and found *B. coli* in pure culture in but 5 cases and a mixed culture in a sixth. In 50 cases of meningitis of this series under 3 months of age three were due to *B. coli*. Barron's[9] figures run higher, as he records 42 cases of meningitis up to 5 months, 39 of these under 3 months and 19 newborn. Seven of these 19 were due to *B. coli*. Levinson[10] very adequately describes meningitis due to this organism. Braid[11] had a case that had a fatal termination 36 hours after the onset and Rucks,[12] in 1929, reported a case that appeared to be a pyelitis until 13 days after the onset, when an intracranial condition became evident. Karplus[13] found that *B. coli* was the organism in 12 of 40 cases of meningitis in the newborn; Cruickshank,[14] in an analysis of 800 newborn deaths, listed 33 due to meningitis, and 11 of these were due to a colon bacillus

infection; Fothergill and Sweet[15] collected 705 cases of meningitis during a period of 12 years and 9 of these were coli infections with 8 of them under 5 weeks of age; and Craig[16] found *B. coli* the causative agent in over half of his cases in the newborn. Rauch and Krinsky[1] report a case with recovery that occurred in 1939, and recently Sweet,[17] at the Gallinger Municipal Hospital of Washington, had two fatal cases under ten days of age.

PATHOGENESIS

Because colon bacillus meningitis is most prevalent in the newborn it is believed by some that the passage through the birth canal may be an etiologic factor. Braid's[11] case had the same culture as from the mother's cervix, and Goldreich[18] believes his case to have aspirated contaminated amniotic fluid. Otitis media leading to mastoiditis and meningitis was believed to be the source of infection described by Schere,[6] Vonderahe and Baurichter,[19] Thompson and Quinn[20] and Segiet.[21] The urinary system has been reported as a probable source of infection by many: Holt,[7] Neal,[8] Koplik,[22] Allard,[23] Kovalevsky and Moro[24] and others. Infections also have been cited via the intestinal tract, the placental circulation, morbid condition of the skin, a contaminated examining finger in the infant's throat. Neal[8] believes that many of the positive cultures on autopsy may be contaminations. The consensus of opinion, however, is that the infection is carried to the meninges by means of general sepsis. The source of infection in the case presented was obviously a small abscess at the site of operation. Digital dilatation ruptured this abscess, causing general sepsis, the infection thereby reaching the meninges.

TREATMENT

Until the past year colon bacillus meningitis was given a hopeless prognosis. To the growing number of diseases that have been successfully treated with the sulfonamides, we can add *B. coli* infections. Thompson and Quinn,[20] in this country, reported the first case of *B. coli* meningitis successfully treated with the sulfonamides. This patient was an adult, the infection was contracted from swimming in contaminated water. Rauch and Krinsky[1] treated their case to recovery with sulfapyridine. The case here reported received sulfathiazole at first and then sulfapyridine with a complete recovery. The newborns seen by Sweet[17] received sulfapyridine, but both died in a few days. Carey,[25] in outlining the uses of sulfonamides, states that sulfanilamide and sulfathiazole are more efficient against the colon bacillus than is sulfapyridine. In the case here reported the temperature declined under sulfathiazole therapy despite spinal fluid concentration of only 3.2 mg. per 100 c. c. While the child responded more rapidly with the change to sulfapyridine, he also had the distressing toxic effects. Sulfathiazole is not generally acknowledged to be the drug of choice in meningitis because of its poor concentration in the spinal fluid. Leffler[26] has shown the spinal fluid concentration to be about equal to that of the blood.

SUMMARY

(1) Recovery of a case of meningitis due to the *B. coli communis* in a 3 weeks old infant is reported.

(2) The newer chemotherapy promises to lower the mortality of *B. coli* meningitis.

(3) Meningitis due to the colon bacillus is rare, but this is the predominating organism in the newborn period.

(4) Early diagnosis of meningitis in the newborn is difficult due to the lack of signs and symptoms.

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THE USE OF PROGESTERONE IN NERVOUS TENSION STATES*

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In the two weeks preceding the menses numerous women (40 per cent according to Israel[1]) have annoying nervous symptoms. In the majority of these, sensations are not sufficiently severe to require medical aid, but in some they progress to a marked degree. The most common complaint is a feeling of internal tension or "inward nervousness" which reaches a climax immediately before the menstrual period. The patients indicate that any outward nervousness is insignificant compared to that internal nervous feeling. This tenseness is often centered in the abdomen and may be accompanied by pains and a palpable spastic colon. Dysmenorrhea is present in some, but not a majority. Severe constant headache in the last half of the menstrual cycle is not uncommon. Some patients cannot remain at rest, but are "jittery." Occasional cases have symptoms of agitated depression. Painful swelling of the breasts is sometimes present with the tension. Certain cases are extremely highly sexed. An accurate and stimulating discussion of premenstrual tension was given by Israel[1] in 1938. He treated ten women, using progestin in 3, progestin and low dosage radiation in 4, low dosage radiation in 2 and insulin in 1, with good results. Israel suggested that premenstrual tension is caused not by an excess of circulating estrogen, as previously suggested by Frank,[2] but rather by the presence of unantagonized estrogen.

Following Israel's paper, cases have been observed by us. Relief of symptoms has been obtained, as a rule, by injections of progesterone. It has also been noted that in many cases certain degrees of tension are present throughout the cycle, in some extreme, though usually with premenstrual accentuation. It seems that the majority of our cases have nervous tension more constantly than premenstrually alone and that it may occur in women who have had a hysterectomy or even bilateral oophorectomy. A case with marked symptoms is given in some detail.

CASE REPORT

A divorcee of 39 years complained of nervousness and dizziness since a mastoidectomy 17 years previously. Thirteen years earlier the pelvic organs, including the ovaries, were removed. In the previous several years she has been extremely nervous, "just going to pieces," and had dizziness which "scared her to death." For prolonged periods she walked constantly, could not sit down, crying much of the time. She felt that if she could get some poise and relax she would not worry about anything. Hot flashes had occurred only occasionally in the last several years. She was particularly nervous after eating. She slept well.

Examination showed a well-nourished woman with atrophic vaginitis and extreme nervousness.

Five twenty-four-hour specimens of urine were examined for pregnandiol, and all were completely negative. Two twenty-four-hour specimens of urine were examined for estrogenic hormones.* One showed between 5 and 6.6 rat units of estriol per liter, less than 10 rat units of estrone and between 10 and 13 rat units of estradiol (Smith and Smith method). In the other specimen the findings were: estriol less than 5 units, estrone less than 10, and estradiol less than 10. These findings are compatible with a menopausal state.

In the next seven weeks the patient was given 60 mg. of progesterone in 5 mg. doses with extraordinary improvement. The motor activity quickly diminished, the visible nervousness almost completely disappeared and the internal tension relaxed until she felt essentially normal. All treatment was discontinued and she felt well for seven months. Then she became very nervous, could not remain quiet, cried much of the time and had an intense desire for sexual intercourse. In the following three weeks she was given six injections of plain sesame oil. After the first one or two injections she felt somewhat improved, but with the remainder became increasingly more nervous, crying most of the time and feeling "horrible." In the next six weeks she was given 26 mg. of progesterone in 13 injections with remarkable improvement. The patient was quite calm and relaxed. One month after treatment was discontinued she was beginning to feel nervous, although symptoms were not marked.

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*From the Department of Obstetrics and Gynecology, University of Louisville School of Medicine.

*A laboratory for quantitative endocrine studies has been aided by a grant from the Upjohn Company.

Four twenty-four-hour specimens of urine collected while she was receiving the large doses of progesterone showed traces of pregnandiol each time and a fifth one month after cessation of therapy showed no trace. Estrogenic studies after the first series of injections showed no detectable amount of hormones.

In this patient extreme nervous tension states were relieved with progesterone and not materially affected by the plain sesame oil injections, suggesting that improvement was not caused by psychic effect of the injections. Hormone studies showed no pregnandiol before treatment as might be expected in this castrated woman. Only traces of pregnandiol were excreted after rather large injections of progesterone.

In this series there are 38 women, varying from 20 to 45 years of age, averaging 33 years. Four had had hysterectomy, one also having had a bilateral oophorectomy. The main complaint was nervous tension, which was worse in the premenstrual period, but in the majority was present throughout the month. Twelve patients complained of severe headaches before the periods, being the presenting symptoms in four. Some degree of menorrhagia was present in 16. Dysmenorrhea was present in 11.

Sex problems were present in at least fifteen cases. Ten complained that they never enjoyed intercourse. Three abhorred intercourse, having a tremendous fear of pregnancy, one having had an hydrocephalic idiot as her only child. One feared intercourse because her husband had had gonorrhea. One, highly sexed, never had intercourse because she hated her husband. Five had varying degrees of abnormally intense sex desires, one constantly speaking of sexual matters, and another was unable to be satisfied by repeated intercourse. Two had illicit love affairs.

Four patients had been divorced; four were seriously contemplating divorce, and two spoke of being "old maids" at 27 and 32.

Two patients, aged 39 and 45, had symptoms of agitated depressions, one committing suicide and the other obtaining relief only after psychiatric hospitalization.

One patient had difficulty in her professional position. One was much disturbed that her husband was an alcoholic. One young woman had an intense fear of insanity.

In at least 17 of these cases there were rather obvious associated factors, as sex problems or worries described above.

These patients have been treated from the short time of a few weeks to continuous treatment for 2 years. They have received progesterone* intramuscularly in doses from 1 to 5 mg. repeated daily, twice weekly, once weekly or once or twice monthly. The injections were larger or more frequent in the premenstrual period and as a rule dosages were larger when the symptoms were more severe. Every patient but three showed some improvement: 13 marked; 14 moderate; 8 slight, and 3 none. Of the three with no improvement one had symptoms of agitated depression, one had menopausal symptoms and the last one had only one injection. Those with marked improvement were treated longer than one month and as a rule more intensively. Nine of the twelve with headaches were improved or relieved.

Two patients were given courses of injections with plain sesame oil during treatment or for relapse with consequent recurrence in symptoms or lack of improvement. This seems to indicate that improvement is not caused entirely by the psychic effect of the injections.

The symptoms of premenstrual tension seem very clear. While the tension is accentuated during the premenstrual period some degree of tension, at times most marked, may be present throughout the cycle. The cause is not clear. Deficient production of progesterone is suggested only because the symptoms are accentuated in the premenstrual period when the corpus luteum is present and by the apparent fact that relief follows injections of progesterone. Two of our patients had endometrial biopsies before treatment with full progesterone effect. Furthermore, the usual case with anovulatory metrorrhagia does not present the tension states. Progesterone may be necessary to balance hormone metabolism in these cases as suggested by Israel. Or progesterone may have a nonspecific sedative action. The study of psychic problems in this series is incomplete, but may be of considerable importance. It is doubtful, however, that the problem is entirely relegated to psychiatry, but probably indicates the necessity of an interrelation of gynecologic endocrinology and psychiatry in the cure of these patients. The relief of symptoms with progesterone, in the majority of cases, is impressive.

SUMMARY

A series of 38 women with nervous tension states, probably of endocrine and psychiatric

*The majority of the progesterone used in this series was very kindly furnished in the form of Nalutron by the Medical Research Division of the Winthrop Chemical Company.

etiology, is reported. Relief of symptoms with no formal psychotherapy occurred in the majority of cases after intramuscular injections of progesterone.

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LIMITATIONS OF ESTROGEN THERAPY*

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The importance of the endocrine glands has been established. Their capacity to cause profound disturbances in growth, development of intelligence, determination of sex characteristics, and the control of the nature and rate of chemical changes in the body is being rapidly clarified, but the manner of their interrelationships is not, as yet, well understood.

The two most important procedures in the diagnosis of endocrine disorders are a detailed, careful history, and a painstaking physical examination of the patient by one interested in endocrinology. The indiscriminate use of these powerful catalytic agents, too often prescribed without adequate physical examination, for everything from falling hair to normal senility, does not enhance the prestige of our profession, and adds materially to the financial burden of the patient. Far too frequently fundamental findings are ignored because too much weight is given to a single laboratory test to the exclusion of careful clinical observation or painstaking physical examination.

To be fair to ourselves, we must recognize and admit the present limitations of endocrine substances as we know them in order to detect dangers, avoid hasty, enthusiastic decisions and prevent careless, indiscriminate use of them.

In this discussion only those conditions referable to estrogen therapy will be discussed. The term estrogen will be used collectively, for all substances having the property of producing estrus.

There are at least three estrogenic substances, estrone, estriol and estradiol. To differentiate these, the pharmaceutical houses have many different trade names. The structures and their chemical interrelations have been well established and they are similar in regard to their physiologic properties, although differing in potency, rapidity of absorption, and elimination.[21 22] In doses five to ten times the subcutaneous dose they are supposed to be effective by mouth.

He who prescribes endocrine substances must be certain of at least four things:

(1) Conditions other than endocrine disturbances have been excluded as causative of the symptoms.

(2) Experience of authorities and experiments shows that the new materials are safe.

(3) There is a rational basis and at least some expediency as to the efficiency of the substance in treating the disease for which it is to be given.

(4) Proper doses must be administered.

No one will question the miraculous results of estrone therapy in gonorrheal vulvovaginitis in children, or the treatment of true menopausal syndromes, or the improvement in cases of simple hypomenorrhea and other specific conditions where cause and effect are known. I, however, have been asked not to extol estrone therapy, but briefly to outline its limitations. In so doing, I do not wish to appear pessimistic or derogatory, but to express my experience in the use of the estrogens. I shall briefly outline it.

(1) Organotherapy is a specific therapy, and therefore a limited therapy. The most important requisite is correct diagnosis. Reserve treatment until the diagnosis is ascertained. After the diagnosis has been made the most beneficial results can be obtained with organotherapy only when the general condition of the patient is at its optimum. Anemia, malnutrition, foci of infection, bad health habits and exhaustion have to be corrected. The better the general state of the individual the better the results with endocrine therapy.

(2) Estrogen therapy is replacement, or substitution therapy. This removes the possibility of producing a stimulation of gland action. In other words, the substitute or mimic never originates. Simply to replace the absent or deficient secretions of an involved gland, or the results of a destructive lesion, is not so simple in endocrinology as it seems, for substitution therapy in endocrinology depresses the gland for which the attempt at substitution is made, or when a

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gland is capable of stimulation or physiologic activity it responds best when its deficiency is greatest.[12 24] So substitution therapy in endocrinology results in further depression of the gland under treatment by the substitution agent used.

(3) Individual receptivity variations also limit its usefulness. We are without an understanding as to why a particular person or cells should be sensitive to a particular chemical substance, or as to how to explain apparent variations in susceptibility among different individuals, and in the same individual at different times. We know that one group of patients will respond beautifully to small doses of a substance while another with apparently an identical condition will not give a satisfactory response, even with larger doses and an extended time of treatment. Nor have we a satisfactory explanation of why or when any two substances can be synergistic and antagonistic in varying doses in one individual.

(4) We are also cognizant of the fact that treatment with certain hormone preparations is followed by a resistance of the treated organs to these substances, thus the production of anti-hormones.[6 11 19] The existence of antihormones has been established for gonadotropic, growth and ketogenic hormones of the pituitary, and suspected for diabetogenic and adrenotropic hormones. Such anti-hormone activity has so far proven a hindrance rather than a help to endocrinology. These anti-hormones are not always specific for the particular animals; they are, however, absolutely specific for the individual hormones. Estrogenic hormones at present have not been definitely proven to produce anti-hormones, but they are known to have antagonistic or depressing effects upon other hormones, and vice versa.

(5) The antagonistic effect is beautifully exemplified in their neutralizing the over-active pituitary hormone in menopausal disturbances.

With such antagonistic actions the effect of estrogen therapy will be limited by the degree of abnormal secretion of its antagonist. This means an individual variation in response to therapy with these hormones.

(6) Estrogens have proven of great value in the treatment of the menopausal syndrome, yet there are limitations in its use here.

(1) One must be sure that the symptom complexes of middle life are the results of estrogen deficiency, and not the result of nervous and physical exhaustion from social and emotional maladaptations.

Estrogen therapy, regardless of the dosage and duration of treatment, is a poor substitute for psychotherapy in cases of nervous and physical exhaustion. This is an explanation of why there are wide ranges of response to estrogen therapy in menopausal syndromes.

(2) The milder cases of menopausal syndrome are generally treated better by building up the general physical state, and with guidance, sedatives, helping the patient to adjust herself and to carry through, rather than by relying entirely upon the estrogens to regulate the symptom-complex. If one keeps the patient teetering along upon these hormones, one may permit her to undermine her general state of health.

(7) Addiction to estrogen therapy brings up another hindrance or limitation. How many women are leaning on the psychologic shot of estrogen,[1] weekly or even bimonthly, to restore their youth and vigor, when what is needed is a better adaptation to their environment, emotionally, nervously and physically. Estrogen alone can never replace such needs as the will to live, fortitude, patience and persistence.

Let us remain level headed with organotherapy in menopausal syndromes, remembering that one's physical status must first be kept at an optimum, and using hormone preparations only when there is a definite indication, and in doses which produce physiologic as well as psychologic effects.

(8) Sexual frigidity is usually so closely linked with emotional and psychic problems, and may have such a complex psychic background that a definite place for estrogen therapy in this condition is quite difficult to determine.[25] A careful and thoughtful psychologic examination is the most useful method of investigation, and sympathetic history taking may reveal underlying causes of dyspareunia and emotional disturbances which gallons of estrogen therapy will fail to benefit. How much the few reported improvements may depend upon suggestion in contrast to the many unexpected failures does not speak well for estrogen therapy in these cases.

(9) Amenorrhea in the absence of demonstrable constitutional disease, or of any desire for pregnancy is not in itself an indication for estrogen therapy, for vaginal bleeding without ovulation is only temporary and valueless.[2 3 9 16] Once the reason for amenorrhea is established, intelligent treatment can be carried out. Amenorrhea beyond a year's duration is unlikely to

be cured. Estrogen therapy is not a stimulant to exhausted endocrine glands.

One of the most striking things in the literature is the almost total lack of reports of clinical failures in cases where endocrine preparations have been used.

(10) Endocrine therapy cannot completely stimuate physiologic action or correct pathologic conditions in sterility.[26] [27] The pathology behind the symptoms determines the prognosis. This is too great a problem to be solved by estrone hormone therapy alone.

The problem of sterility is far too complex to be treated by "shots" alone. At least 35 per cent of the problem is in the male and when the sterility is due to the female, there are frequently as many as three distinct causes found, all of which cannot be cured by "shots." Too often have we hoped in vain that by building up the substance secreted by the individual's ovaries we might produce gestation.

(11) For the treatment of essential dysmenorrhea the administration of any of the sex hormones has not proven physiologically rational, and cannot be depended upon for lasting effect.[5] [18] Here the psychologic and general factors are predominant. Many are the tools in the armamentarian of the physician in the treatment of such cases, but few are the complete cures.

General upbuilding, carefully planned diet and exercise, correction of known abnormalities and thyroid therapy, sedation and psychotherapy may be of importance in dysmenorrhea.

(12)Threatened and habitual abortions or early disturbances in pregnancy have recently been fairly satisfactorily treated by progesterone, augmented with estrogen.[13] Such hormonal therapy may be of benefit in cases where there are slight defects, but it cannot be expected to regulate defective germ plasm. In other words, estrone therapy will not prevent bad apples from dropping off good apple trees. This limitation should be recognized, and if recognized doses do not produce the desired results therapy need no longer be continued, and thereby one may aid nature in getting rid of defective germ plasm.

(13) Estrogen cannot promote growth of the infantile uterus and pelvic structures when these structures are refractory to the estrogens. Pituitary therapy needs be added. Unfortunately and all too frequently, reports are based on observations of symptomatic improvement in conditions for which psychotherapeutic effects cannot be excluded.

Such studies should be controlled by human vaginal smear studies (Papanicolaou), and gonadotropic hormone excretion studies, which may indicate changes in pituitary activity. One may not rely blindly upon subjective improvement.

(14) Endocrines have been used in hyperemesis gravidarum. Although there is a marked endocrine imbalance in toxemias of late pregnancy, hormonal therapy in these cases is still in the realm of research and not as yet clinically applicable.[4] [14] [20] This clue may lead to further facts, but in the treatment of pernicious vomiting, estrogen therapy is valueless.

(15) The dangers of bringing out latent tendencies to cancer in susceptible cases, or developing malignant changes in breasts, or lighting up cancer after treatment must be considered.[7] [8] Estrogens should be given with extreme caution to women with breast disease or with a family history of carcinoma. However, experimental evidence as to the carcinogenic effect of estrone need not lead us to great fear of its clinical counterpart. It has been calculated that it would take fifty years of ordinary administration to produce a carcinogenic effect upon human beings.

(16) Use of estrone in cases of hypertension and arthritis seems to produce more of general improvement and psychotherapeutic effect than any specific results.

(17) Although estrogen therapy has a place in the treatment of involutional psychosis, here, too, one must have the specific therapy for the proper psychosis and not depend upon estrogens for all cases of depression of middle age.

(18) Estrone therapy cannot cure the bearded lady, nor is there a female sex hormone for the treatment of obesity.

(19) Another limitation is in administration of estrone to allergic individuals. The side-reactions of urticaria, parotitis and local points of tenderness and pain as the result of oils used in preparation of proteins in the solution are at times very distressing and limit their use in these individuals.[10]

(20) I do not believe that estrone has a specific place in the treatment of functional bleeding.[15] [22] [28] Excessive doses of estrogen depress menstruation and lactogenic functions of the breast and pituitary. Such doses are not only temporary, but very costly, and are harmful because the cause is left untreated. Proper diag-

nosis and treatment of the cause of the bleeding is not only less expensive but more satisfactory and more lasting.

To me the greatest fallacy is the belief that if we can pep up the individual temporarily by some substance that we can change the whole personality.

In many of the functional disorders, the patient must first assume responsibility for the changing of her health habits and attitudes, and here the physician can be only a guide. Unless the patient can be shown the course that the emotional and nervous instability takes, and how it produces her present symptoms, she cannot understand how to help herself, will not help herself, nor will she be helped by estrone. To rely upon shots of estrone, or upon any hormone therapy, given to increase pep of the individual in the hope of straightening out a nervous exhaustion or anxiety neurosis is useless.

SUMMARY

In understanding the limitations of estrogen therapy and using these products properly, correct diagnosis and specific therapy given to individuals in the best possible state of health is essential.

Some of the conditions treated by estrogen therapy in which results have not been wholly satisfactory have been reviewed and an appeal has been made to use organotherapy only as a specific therapy.

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ANALGESIA IN LABOR*

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The medical profession must give some form of analgesia to the woman in labor, since public opinion is gradually, though definitely, coming to the point where women demand relief. Articles in magazines and newspapers are headed, "I had my baby the new way." So it behooves the medical profession to become familiar with some of the new ways.

Analgesia can be given by mouth, hypodermically or per rectum. When it is given by mouth some form of the barbiturates or paraldehyde is used. When given hypodermically some form of the opiates and/or scopolamine is administered. Some men have used pentobarbital sodium intravenously. For rectal administration, Gwathmey's oil-ether-quinine mixture is familiar to you. Paraldehyde and sodium amyl-beta-bromallyl barbiturate have also been used. Since

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there are many analgesic drugs, it behooves us to become familiar, possibly not with all of them, but certainly with one or two. In that way the effect of the drug on the patient can be evaluated. Thus one comes to know whether a patient is properly dosed or overdosed. Therefore, it is very essential to become familiar with some one form, if analgesia is to be used successfully.

Morphine, dilaudid, pantopon and other opium derivatives have been employed hypodermically for years. In some instances these will give much relief. Ordinarily, however, they do not produce analgesia, that is, loss of memory and loss of pain. Often if we use doses of more than ¼ grain of morphine, the baby becomes badly asphyxiated. Personally, I have worked for two hours to resuscitate a baby whose mother accidentally received a half grain of morphine and delivered shortly after. No doubt many of you have had the same experience. Morphine is not without its dangers if given too soon before the delivery of the baby. The same thing holds true with most of the opium derivatives. Regarding Gwathmey's oil-ether-quinine analgesia, my experience has been limited and I am not prepared to say whether or not it has proven satisfactory.

I notice that the dosage of quinine is 20 grains. My experience has been that many women who are given but 5 grains of quinine will have very severe uterine contractions and will deliver promptly. Other patients who have received as much as 30 grains have had no uterine contractions. It cannot be determined in advance whether or not a woman is sensitive to quinine. I have hesitated to use the Gwathmey technic for that particular reason. I remember distinctly a multipara who delivered thirty minutes after a 5-grain dose of quinine. Her screams could be heard all over the hospital. In deliveries of that type, of course, the danger of fetal brain hemorrhage is very great.

There are certain things that should be thought of whenever analgesia is to be given to a patient. First, the patient should be protected against self-injury, as some become wild. I have employed two general ways. One is to insist that the patient be under the constant supervision of a trained nurse. The floor service is instructed to wait on this nurse. Anything that she needs is brought to her. She does not leave the room or the patient under any circumstances. Second, is to have sides put on the bed. However, after having one or two women climb over these sides, we have insisted that the patient be watched or be placed in such a position that the floor supervisor or some other floor nurse can watch her from the nurse's station. Under no circumstances is she to be left unwatched.

If this care is not taken I think that the medical profession and the hospital are liable for any injury the patient may sustain. Before the above regulations were insisted upon, a woman was found walking down the hall toward the fire escape on a winter night. She had opened the door to walk out. She was going home. If she had escaped the watchful eye of the supervisor there certainly would have been severe criticism of the hospital and the attendants.

When to give the drug is another problem. For this discussion I have divided patients into primiparas and multiparas. The drug is administered to primiparas as soon as regular pains are established at intervals of six minutes or fewer, or if the patient is complaining bitterly of pain, regardless of the amount of cervical dilatation, except when the patient is near delivery. In multiparas, on the other hand, the drug is given earlier. As far as the pains are concerned, the interval can be nine or ten minutes, providing the patient is uncomfortable. The amount of dilatation is not important except for the fact that the drug should not be given when delivery is anticipated within two hours.

I use pentobarbital sodium because it was one of the first drugs on the market and is the one with which I have had the most experience. Other barbiturates may be used. My only suggestion is that you familiarize yourself with one drug and then stick to it. Do not go shopping around from one drug to another, because they all have a different action and reaction.

As to the amount of drug to be given: I start with 7½ grains of pentobarbital, together with 20 grains of sodium bicarbonate, as the primary dose. If the patient does not sleep between pains, a grain and a half of pentobarbital and 5 grains of sodium bicarbonate are given in three-quarters of an hour. Usually with the first dose the patient snores in twenty to twenty-five minutes. She will be aroused only at the time of the pain. There are a few patients, however, who are resistant to that size dose and do not go to sleep. In the first stage of labor the dose of one and one-half grains every three to six hours is repeated as needed to keep the patient drowsy.

As soon as patients reach the second stage of labor they are aroused all the time. They may cry out with pain. It is useless at that time to give any more pentobarbital. The average dose for primiparae is 9 grains. Occasionally it goes as high as 12 or 13½ grains. If there is a patient with a borderline contracted pelvis to whom we wish to give a longer test of labor, it may be necessary to repeat the grain and a half of pentobarbital every four to six hours.

Be careful not to overdose the patient. Some women are stimulated by barbiturates and become very talkative. The conversation is usually somewhat erratic. They will not remember what has happened to them. Overdosing is common in this type of patient.

In multiparas I usually start with 7½ grains, providing the patient is not having very strong pains. Where the pains are severe, 9 grains are given as the initial dose.

I think it is a mistake to start with 3 grains of sodium pentobarbital or 4½ grains of sodium isoamyl ethyl barbiturate. That is why most men are dissatisfied with any type of analgesia. The patient is not sufficiently depressed, and she can remember. She is disappointed and becomes antagonistic. Then if one gives more of the drug, he has greater difficulty in getting her to sleep than if he had used larger doses in the first place.

I have gone through the experimental dosages and can confidently say that if one gives fewer than 6 grains of pentobarbital as the initial dose he is going to be disappointed.

Occasionally patients who have had 7½ or 9 grains become exceedingly restless under the analgesia. It is the duty of the nurse in charge of such a patient to protect her from self-injury. Mattress pads are put around the head of the bed and the side next to the wall. One side of the bed is always against the wall and the other side left open for the nurse to attend the patient. For rather wild patients one-sixth of a grain of morphine is used hypodermically, or 1/80 of a grain of apomorphine. If the woman is very large sometimes 1/60 of a grain of apomorphine is given. Either one of these drugs will usually quiet the patient.

Another essential so far as management is concerned is that analgesic patients should be fed during labor and given water. An easy way to feed them is with orange juice or grapefruit juice fortified with corn syrup. This gives them the necessary liquid, also sugar. An ounce of corn syrup to six ounces of either orange juice or grapefruit juice is given every two hours during labor. The only objection is that occasionally patients vomit. It is very essential that patients who are having a 12- or 16-hour labor be fed at regular intervals.

I repeat during all this time that these patients must be under strict nursing supervision. They are never to be left alone under any circumstances.

In the second stage of labor these patients are not controllable. They will toss about if not restrained, and if they are set up for delivery, all of the linen will be contaminated in a few minutes. We have discarded flat delivery altogether and now put these patients up in stirrups. Their hands are put in handcuffs at the side of the delivery bed, and padded shoulder restraints are placed at the shoulders, so that the patient will not push away from the end of the delivery table. This is essential if one hopes to preserve his aseptic technic. In most instances the patients will not cooperate in the bearing-down period. Many times low forceps are used; therefore, the forceps incidence is increased.

I believe that labor in most analgesic patients is markedly shortened. It is not uncommon for a primipara to deliver in six to eight hours after the initial dose of pentobarbital. Almost without exception multiparas will deliver in three hours.

In a typical case of dystocia dystrophia syndrome, where the patient complains bitterly of backache in labor, the complaint is often eliminated and cervical dilatation will proceed rapidly. The labor pains are not decreased in intensity. They may be decreased in length or the interval increased between pains. Another factor which impresses me as being favorable is that the perineum and the rectum lose their tone. There is no voluntary or involuntary spasm.

One hears a great deal about asphyxia of the baby in analgesic labors. Those who have large clinic practices have seen asphyxia in babies born to women who have had morphine, and to those who have had no form of analgesia. I feel that the percentage of asphyxias in the carefully controlled analgesia service is not any greater than in ordinary services. I think one sees asphyxia in the patient who is overdosed

or is given analgesia too close to the expected delivery. It is more important to know when not to give analgesic drugs than when to give them.

As a general rule, the asphyxiated babies will respond to the usual tracheal catheter treatment and nothing further need be done. It is true that once in a great while there is a baby which is more than ordinarily asphyxiated or fails to respond to the tracheal catheter stimulation. That is the exception.

I feel that for premature babies weighing 5 pounds or under, it is not safe to use analgesia in labor. I cannot say why. It is safer to resort to anesthesia at the end of the second stage.

All analgesic patients are delivered under gas; the anesthetic usually is ethylene-oxygen and occasionally ethylene-ether mixture for the end of the second stage.

The only maternal contraindications against the use of analgesia is any condition in which the urinary tract is severely damaged. I use it continually in heart cases and I feel that it has helped to prevent exhaustion.

Dr. James R. Garber, Birmingham, Ala.—Have you experienced shock with the use of pentobarbital?

Dr. Cornell.—I have never seen a case of syncope or shock from the use of pentobarbital, and I have given it or supervised the giving of it in more than 1,500 cases.

Dr. F. O. Plunkett, Lynchburg, Va.—Have you ever given paraldehyde?

Dr. Cornell.—After Dr. Kane's article appeared, I tried paraldehyde as he recommended it. I had some good results, but I could not get myself adjusted to its use.

Dr. Edward Speidel, Louisville, Ky.—Do you prepare your patients mentally for the ordeal of labor in order to be able to use as little anesthesia or analgesia as possible?

Dr. Cornell.—I can perhaps best answer that by saying that all pregnant women who come to me now expect to get analgesia. If we do not give it to them because of the shortness of time the patients are disappointed and critical. They do not realize why they cannot have analgesia even in short cases. I used to have a "pep" talk for patients about the ordeal of labor, but it was usually wasted, because their friends liked to talk about their "terrible" labor. Often lay opinions have more weight than the professional.

Dr. Milton Smith Lewis, Nashville, Tenn.—What about the use of local anesthesia when reaching the second stage of labor?

Dr. Cornell.—I have used it only a few times. The times that I have used it, I have miscalculated the time of delivery. The patients delivered later than I anticipated and the local anesthetic had worn off.

Dr. B. Schneider, Louisville, Ky.—Is it possible that there have been intra-uterine deaths with the use of analgesia?

Dr. Cornell.—I have never seen one. I think that the probability is that an intra-uterine death under analgesia is due to some other factor, whether you can discover it or not.

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EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Thirty-Fifth Annual Meeting
St. Louis, Missouri, November 10-13, 1941

ST. LOUIS, A GREAT MEDICAL CENTER

No city in the territory of the Southern Medical Association can boast a more effective system for educating young men of America to meet the problems of medicine than St. Louis. The two outstanding schools, St. Louis University School of Medicine and Washington University School of Medicine, long ago attained national recognition for their programs of instruction and investigation. But these institutions, not content to rest on laurels bestowed upon them decades ago, are striving constantly for improvement. This fact in part accounts for the success of both schools and for the respect which the profession throughout America maintains for these schools.

St. Louis is among the nation's leaders in the quality and quantity of hospital facilities. Not only is the equipment maintained on an extraordinarily up-to-date basis, but the personnel is adequate and properly qualified. With an exceptional staff of men such as are found in St. Louis there is no wonder that this city has become the envy of medically-minded America.

This has a tremendous bearing on the success of the thirty-fifth annual meeting of the Southern Medical Association in St. Louis, November 10-13. Physicians of the South on this occasion will have an unusual opportunity to observe the work of the St. Louis medical schools, hospitals, institutions and individuals, when these groups are striving to make each visitor glad that he has made the trip.

VITAMIN A IN THE HUMAN LIVER

A tremendous food storage depot is the liver. This organ from beef or hogs serves as an invaluable source of the water-soluble B vitamins. Most commercial supplies of the fat-soluble vitamins A and D depend upon fish livers, as the cod and the halibut. Vitamin C is also obtained from the liver, and the liver of animals is a great storehouse for the carbohydrate glycogen (animal starch). The liver contains mechanisms for detoxifying many poisons. It is difficult to test liver function in life because this organ has a thousand functions, regulating and supplying many of the food materials of the blood.

Investigators at New York University[1] have examined the livers of more than one hundred patients at autopsy, of whom nearly a fourth were normal persons as far as could be ascertained. In patients with cirrhosis of the liver and with acute infection and associated liver pathology, vitamin A and its precursor carotene were notably decreased in the liver. In the group with cirrhosis, the ratio of A to carotene was increased significantly. With the destruction of normal hepatic cells, the ability to store vitamin A was reduced and the conversion of carotene to vitamin A interfered with. Vitamin A storage in the liver, they conclude, depends upon the dietary intake and the condition of the liver cells, the most disturbing condition to vitamin A storage being cirrhosis.

One would conclude that the normal human liver perhaps stores a carotene reserve much as it stores a glycogen reserve, to be mobilized on demand into the blood. The human liver, like fish liver, is a good source of vitamin A.

HYPERTENSION AND KIDNEY ISCHEMIA

Among the most interesting of recent paths of investigations have been those on the production of hypertension by constriction of the kidney or its blood vessels. The blood supply of

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the kidney is diminished by partial occlusion of its artery or by wrapping the kidney itself in a cellophane or similar membrane.[1]

Angiotonin is a pressor substance which may be extracted from normal kidney tissue, and neutralized by normal blood plasma. The ischemic kidney likewise contains a pressor substance physiologically like angiotonin, but chemically different.[1] Angiotonin is not neutralized by the blood from an experimental animal which has ischemic kidneys.[2] The association of clinical heart disease and hypertension has long been noted.

The most dependable means for production of experimental cardiac hypertrophy in the rat, according to Herrmann, Decherd and Erhard,[3] of the University of Texas School of Medicine, is by a method used by a number of workers, of exposing one kidney and wrapping it in a single layer of gauze which is then painted with collodion to make a firm molded capsule. The other kidney is later removed, and the animal left with one constricted kidney. Within ten days surviving rats showed definite cardiac hypertrophy, with a maximum heart reaction probably within thirty days.

The technic affords a practical method of study of the relationship of hypertension and cardiac disease.

CANCER FACTORS

Cancer is often graded surgically and clinically by the degree of its invasion of normal tissues. In histologic examination of suspected tissue for malignancy the term "precancerous lesion" is used rather loosely, according to Robert Meyer,[4] of the University of Minnesota. Meyer says that a lesion, to be precancerous, would have to be capable either of developing into cancer and causing death, or reversing itself and returning to normality. If it cannot return to normal, then it is a cancer already, not a precancer. The latter term he therefore considers unjustified, because the earliest visible morphologic changes now recognized are irreversibly cancer.

Structural changes diagnostic of early cancer of the cervix, according to this author, may be detected when only superficial epithelium is available for study, without observation of its relationship to the underlying connective tissue. Enlargement of nuclei and their size in relation to the cytoplasm may be measured; the disturbance of nuclear form and size is readily seen, and the increase in chromatin content. In curetting the uterus, he believes, scrapings should always be taken from the cervical canal.

In searching for means of early diagnosis, chemical changes in the tissues should be of significance, but knowledge has not developed very fast in this direction. The material within the living cell is constantly being replaced and renewed. The enzymes which permit these changes are delicately balanced and may be disturbed quantitatively or qualitatively. Chronic irritation is said to cause such changes in the ferments or enzymes that normal amino acids are not incorporated within the cells. A synthesis of abnormal protein occurs instead, which may progress to cancer.[1]

Phosphatase, the enzyme which splits phosphoric acid from carbohydrate compounds containing it, is high in the epithelium of the normal adult prostate gland, according to Huggins.[1] This enzyme varies also in the blood with the level of activity of the parathyroid gland. Prostatic cancer has a high acid phosphatase content.[1] After orchidectomy, three-fourths of a series of patients with advanced prostatic cancer showed clinical improvement, and the clinical improvement paralleled a notable decrease in the level of serum phosphatase.[1] This would denote a change in carbohydrate and in phosphorus metabolism in the orchidectomized patient.

In cases of carcinoma of the breast, castration has been employed with many reports of benefit. Cancer is considered to be linked with the period of decline of gonadal activity, and most evidence points to some significant effect upon the environment of the cancerous cells by the secretions of the gonads. The reason for many failures of malignancies to improve after castration is suggested to be the fact that the adrenal, after the lowering of the function of the gonads in mid-

1. Page, I. H.; and Helmer, O. M.: Jour. Exper. Med., **71**:29, 1941.

2. Friedman, Meyer: Neutralization of Angiotonin by Normal and by Ischemic Kidney Blood Plasma. Proc. Soc. Exper. Biol. & Med., **47**:348 (June) 1941.

3. Herrmann, G.; Decherd, G.; and Erhard, P.: Production of Cardiac Hypertrophy in Rats. Ibid., p. 464.

4. Meyer, Robert: The Histological Diagnosis of Early Cervical Carcinoma. Surg., Gyn. & Obst., **73**:129 (August) 1941.

1. Huggins, C.; Stevens, R. E., Jr.; and Hodges, C. V.: Studies on Prostatic Cancer. II. The Effects of Castration on Advanced Carcinoma of the Prostate Gland. Arch. Surg., **43**:209 (Aug.) 1941.

dle life, may take on some of their secretory activity and continue the abnormal stimulation.

Cancer may not be considered as merely a disease of a type of cell, since the development of these is controlled by nutritive conditions of the media in which they are maintained.

TWENTY-FIVE YEARS AGO
From Journals of 1916

Troops on the Mexican Border.[1]—The paratyphoid epidemic in Texas has spread to other New York troops. * * * There are at present said to be fifty men ill with paratyphoid in the Fourteenth Infantry.

English Troops.[2]—The thoroughness of the Germans in organizing for this war during a whole generation is a commonplace. But when the history of the war comes to be written, the manner in which this country improvised and in a short time organized an army ten times as great as had ever been maintained by it for war, on a scale which had never been contemplated, will also be considered remarkable.

Transportation of Wounded.[3]—The excellent preparations for dealing with the wounded have improved with the experience gained in the war. The means of transport are so efficient that during the first stage of the Battle of the Sommes the military hospitals in England began to receive men within twenty-four hours of their being wounded * * * it was necessary to keep the hospitals in France as empty as possible in case of pressure.

Sugar as an Antiseptic in France.[4]—Dr. Lhoste * * * had on several occasions availed himself in veterinary surgery of the cicatrizing properties of sugar by powdering the wounds with this substance after washing them with salt and water. In a few days the wound takes on a healthy appearance and heals rapidly * * * the antiseptic properties of sugar have long been known. Three years ago Dr. G. Magnes, of Marburg, as the result of experiments made in the service of Professor Koenig, recommended sugar as a practical and inexpensive dressing for wounds.

Surgery for Constipation.[5]—I have found chief among causes of constipation, ptosis with retardative angulation of the colon, large flabby and mobile cecum, * * * retardative angulation at the splenic flexure, * * * each of these conditions * * * must * * * find ultimate correction by physical means * * * the day will come when a condition that is obviously surgical from the start will be given the benefit of surgical treatment before the health has become profoundly and dangerously impaired by dalliance with a futile therapy. * * * I several years ago devised the operation for parietal implantation of the colon. * * * Restoration * * * of bowel function is the rule.

1. Our Troops on the Border. J.A.M.A., **67**:889, 1916.
2. London Letter, J.A.M.A. Ibid., p. 757.
3. Ibid., p. 448.
4. Paris Letter. Ibid., p. 825.
5. Reed, C. A.: Treatment of Constipation. Ibid., p. 986.

St. Louis—Where We Meet

WHAT TO SEE AND WHAT TO DO IN ST. LOUIS*

It was on the evening of February 14, 1764, that a little band of French pioneers first landed on the west bank of the Mississippi River, at what is now the foot of Walnut Street in St. Louis. For many days, patiently fighting the current, they had poled and dragged their heavy craft up the great river from Fort DeChartres, sixty miles below. Like the landing of the Pilgrim Fathers, the arrival of this "First Thirty," as they became known, proved a milestone which marked the beginning of an empire.

In the middle of November, 1941, another band of Pilgrims will land on the west bank of the Father of Waters to open the annual convention of the Southern Medical Association.

While St. Louis today is one of the most modern and commercial cities in the nation, it has a background of more than a century of historical events. And St. Louisans carefully preserve the colorful landmarks of pioneer days. Delegates to the Southern Medical convention will want to see the old courthouse, for instance. Here Dred Scott began his famous fight for freedom, changing the course of American history. Here slaves once were sold at the stone auction block at the east door. Here was the starting point of the Daniel Boone trail. The old courthouse stands today as it has since 1862, when its patented cast iron dome first rose down by the river.

In a city where all religions found freedom, all men venerate the old cathedral, built on the river front site of the first mass in 1764. The cathedral houses one of the oldest church organs in the country. And a rather interesting fact about it is that 200 melted Spanish silver dollars were cast with other metal to sweeten the tone of its bell.

As a reminder of more modern eras, the log cabin occupied by General U. S. Grant prior to the Civil War has been preserved on a private estate southwest of the city. The fence surrounding the cabin is made of rifle barrels of the Civil War soldiers. Most convention delegates also are interested in seeing the Eugene Field House, home for many years of Missouri's famous poet.

What will strike visitors first when they come to town, however, is the fact that St. Louis has changed. Her old dirty face is gone. The smoke nuisance was eliminated last winter and sandblasting and washing are brightening up the buildings.

The smoke elimination campaign is an interesting story. St. Louis newspapers took up the cry some time ago about how unhealthful and unsightly were the regular blackouts every winter. At last an aroused public encouraged the appointment of a committee to investigate ways of solving the problem. Under the direction of Smoke Commissioner Ray Tucker, the committee studied the problems and recommended the passage of the smoke ordinance last fall, which requires

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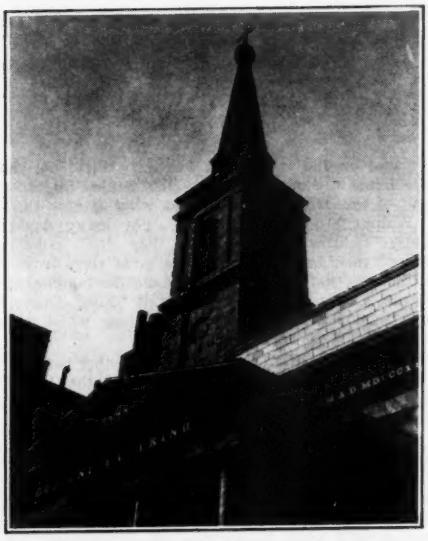

The old Cathedral, one of the historic highlights of St. Louis.

the use of hard smokeless fuels or the use of stokers. Through a special arrangement on transportation, smokeless fuels were made available at almost as low a price as soft coal, and St. Louisans and visitors now literally breathe easier when winter rolls around.

There is something for every taste in St. Louis. For those who are interested in art, there is the million dollar art museum which stands atop one of the highest hills in Forest Park, with world famous paintings, statues and historic exhibits. Especially distinctive about the collection are period rooms of all nations and all times. Daily lectures on the understanding of art are given free of charge at the museum.

For lovers of flora, there are two outstanding botanical displays in St. Louis: Shaw's Garden and the Jewel Box. Named after its founder, Henry Shaw, the former is considered the largest and most complete botanical garden in the world. It is especially noted for rare lily hybrids and orchids. The Jewel Box provides a dramatic display for floral design. Uniquely designed in the modern manner in steel and glass the Jewel Box offers a changing display of plants from the 500,000 floral specimens grown in park greenhouses.

Happy and Pao Pei, two rare giant pandas from the mountains of western China, are playmates at the St. Louis Zoo.

If you like animals, you will enjoy at least one visit to the famous Forest Park zoo. Students from all corners of the world have come to St. Louis to study the colorful and unusual ways by which animal dens and paddocks have been transformed into near to nature haunts. Thousands daily come to see the barless bear pits, the trained elephants, the big cats, the chimpanzee circus and the rarest and most interesting of all, Happy and Pao Pei, the pandas.

While you are in Forest Park, you probably will want to drop into Jefferson Memorial, which houses relics of the old Indian eras, Jeffersonian manuscripts, relics of the Revolutionary, Spanish-American, Mexican and World Wars, manuscripts of French and Spanish days in St. Louis and a complete showing of Lindbergh trophies.

St. Louis is a sporting town and both spectators and those who prefer active participation never are at a loss for things to do. In the parks are excellent tennis courts, softball diamonds, lagoons for boating, facilities for skating or skiing, etc. Incidentally, one of the toughest 18-hole golf courses in the country is located in Forest Park. During the winter, there are ice-hockey, wrestling and boxing shows.

Music lovers find a great deal of enjoyment in concerts by the famed St. Louis Symphony. There also are performances of well-known operas. Theaters in St. Louis, both stage and movie, are outstanding. Night clubs, while inexpensive, are as luxurious as any found in the world. Most important for a convention visitor is the friendly spirit that pervades St. Louis. Every man on the street is glad the guest is here and shows it.

Comfortable sleeping rooms, beautiful lobbies and luxurious meeting rooms are important features of the St. Louis hotels. The inner man is satisfied by the excellent food, prepared by world famous chefs, and service is supreme.

No story about St. Louis would be complete without some mention of the near-by Ozarks. The hazy blue Shepherd of the Hills country, Bagnell Dam and Lake of the Ozarks, famed caves and springs, are but a short drive from the city. Many convention delegates combine a vacation in the colorful Ozarks with their trip to St. Louis.

It is because of these factors that St. Louis members believe that the convention there November 10 to 13 will be one of the most successful, beneficial and delightful in the Association's history.

HOTELS, ST. LOUIS MEETING

Hotel reservations for the St. Louis meeting of the Southern Medical Association, November 10-13, 1941, will be handled through the Hotel Committee. The Committee will give those who wish reservations the hotel of their choice so long as that hotel has available the kind and price of accommodations desired. In writing for hotel reservation one should name the hotel de-

sired, preferably giving more than one choice, indicating kind and price of accommodations desired and expected date of arrival. Address HOTEL COMMITTEE, Southern Medical Association, Dr. J. Hoy Sanford, Chairman, 910 Syndicate Trust Building, St. Louis, Missouri.

Among the good downtown hotels within walking distance of the Auditorium, where all meetings and exhibits will be held, are:

JEFFERSON HOTEL, 12th and Locust
(General Hotel Headquarters)
Single room, with bath, $3.00 per person
Double room, double bed, with bath, $2.50, $3.00, $3.50 per person
Double room, twin beds, with bath, $3.00, $3.50, $3.75, $4.00 per person

STATLER HOTEL, 9th and Washington
(Hotel Headquarters, National Malaria Committee, American Society of Tropical Medicine and American Academy of Tropical Medicine)
Single room, with bath, $2.50 to $3.00 per person
Double room, double bed, with bath, $2.25 to $3.50 per person
Double room, twin beds, with bath, $2.50 to $4.50 per person

DESOTO HOTEL, 1014 Locust
Single room, with bath, $2.50 to $4.00 per person
Double room, double bed, with bath, $2.00 to $3.00 per person
Double room, twin beds, with bath, $2.50 to $3.50 per person

MAYFAIR HOTEL, 8th and St. Charles
Single room, with bath, $3.00 and up per person
Double room, double bed, with bath, $5.00 and up per room
Double room, twin beds, with bath, $5.50 and up per room

MARK TWAIN HOTEL, 8th and Pine
Single room, with bath, $2.50, $3.00, $3.50, $4.00 per room
Double room, double bed, with bath, $4.00, $4.50, $5.00, $5.50 per room
Double room, twin beds, with bath, $4.50, $5.00, $5.50 per room

LENNOX HOTEL, 9th and Washington
Single room, with bath, $3.50 to $5.00 per person
Double room, double bed, with bath, $2.50 to $4.00 per person
Double room, twin beds, with bath, $2.75 to $4.00 per person

CLARIDGE HOTEL, 18th and Locust
Single room, with bath, $2.00 to $4.00 per person
Double room, double bed, with bath, $1.50 to $3.00 per person
Double room, twin beds, with bath, $2.00 to $4.00 per person

AMERICAN HOTEL, 7th and Market
Single room, with bath, $1.50 to $2.50 per person
Double room, double bed, with bath, $1.25 to $1.50 per person
Double room, twin beds, with bath, $1.75 per person

MAJESTIC HOTEL, 200 North Eleventh
Single room, with bath, $2.00 to $2.50 per person
Double room, double bed, with bath, $3.00 and $3.50 per room
Double room, twin beds, with bath, $4.00 and $5.00 per room

WARWICK HOTEL, 1428 Locust
Single room, with bath, $2.50, $3.00, $3.50 per person
Double room, double bed, with bath, $4.00, $4.50, $5.00 per room
Double room, twin beds, with bath, $5.00, $5.50, $6.00 per room

Among the good uptown hotels, all within ten to twenty minutes by taxi or bus from the Auditorium, are:

CORONADO HOTEL, 3701 Lindell
Single room, with bath, $3.00 to $3.50 per person
Double room, double bed, with bath, $4.00 to $5.00 per room
Double room, twin beds, with bath, $6.00 to $8.00 per room

MELBOURNE HOTEL, Grand and Lindell
Single room, with bath, $2.50 to $4.00 per person
Double room, double bed, with bath, $4.00 to $6.00 per room
Double room, twin beds, with bath, $4.50 to $7.00 per room

PARK PLAZA HOTEL, 200 North Kingshighway
Single room, with bath, $5.00 per person
Double room, double bed, with bath, $3.00, $3.50, $4.00 per person
Double room, twin beds, with bath, $4.50 and $5.00 per person

CHASE HOTEL, 212 North Kingshighway
Single room, with bath, $3.00 and up per person
Double room, double bed, with bath, $2.50 and up per person
Double room, twin beds, with bath, $3.00 and up per person

KINGS-WAY HOTEL, 108 North Kingshighway
Single room, with bath, $2.50 to $4.00 per person
Double room, double bed, with bath, $2.00 to $3.00 per person
Double room, twin beds, with bath, $2.50 and $3.00 per person
Double room, double bed, without bath, $1.50 per person

GATESWORTH HOTEL, 245 Union
Double room, double bed, with bath, $5.00 per person

FAIRGROUNDS HOTEL, 3644 Natural Bridge
Double room, double bed, with bath, $2.00 per person

FOREST PARK HOTEL, 4910 West Pine
Single room, with bath, $3.00 per room
Double room, double bed, with bath, $4.50 per room
Double room, twin beds, with bath, $5.00 and $6.00 per room

ROOSEVELT HOTEL, Delmar and Euclid
Single room, with bath, $2.00 per person
Double room, double bed, with bath, $3.00 per room
Double room, twin beds, with bath, $4.00 per room

Book Reviews

Applied Physiology of the Nose. By Arthur W. Proetz, A.B., M.D., Professor of Clinical Otolaryngology in the Washington University School of Medicine. 396 pages, illustrated. St. Louis: Annals Publishing Company, 1941. Cloth $7.00.

This book unveils an entirely new conception of the physiologic activities of the nose and the accessory nasal sinuses. Written especially for the otorhinolaryngologist, it will be of great interest to all physicians. Functions of the nose, structure as a basis for function, the sense of smell, air currents and air pressures in the nose, humidification, heating, ciliary activity, defenses of the mucosa, and vascular neural and lymphatic reactions are subjects thoroughly discussed. The concluding section deals with evaluations of clinical applications of nasal treatment and nasal surgery. The otolaryngologist, as well as those interested in medical history, will find the historical notes extremely interesting.

Clinical Nursing in Medicine. By Julius Jensen, Ph.D. (in Medicine), M.R.C.S. (Eng.), L.R.C.P. (Lond.), Assistant Professor in Medicine, Washington University School of Medicine, St. Louis, and Deborah Maclurg Jensen, B.Sc., R.N. 808 pages, illustrated. New York: The Macmillan Company, 1941. Cloth $3.25.

It is a pleasure to review such an outstanding and painstaking book, although, on account of the many noteworthy features which should be mentioned, a difficult task in the short space of a review.

One of the major problems confronting the internist who lectures to undergraduate nurses is to know how comprehensive or how elementary to make the lecture. This book goes a long way toward solving that difficulty and serves well as a basis for gauging the line between these two extremes.

The title indicates a text or reference work for nurses, but the author had in mind a larger group, that is, such of the general public as might be interested in an elementary textbook on internal medicine.

The fundamental knowledge of medicine in general to be had from this book is of inestimable value to the nurse, even though most of her work may be surgical or obstetrical nursing.

The division of the book into units conforms with the requirements of the National League of Nursing Education, and so renders it acceptable as a text in nursing schools. There are fourteen of these units, each unit containing from one to eleven divisions as the subject may warrant. Typical of the unit headings are: The Infectious Diseases, Allergy, Diseases Due to Poisons, Chemical and Physical Agents, Diseases of the Ductless Glands, etc.

Briefly the plan followed in presenting each disease may be illustrated by Diabetes: Introduction (a brief narrative discussion), Etiology, Physiology, Symptoms, Course and Complications, Treatment, Nursing Care. Since this is primarily a book for nurses, this latter heading is covered most thoroughly. And that the authors speak with authority can be attested by the fact that Dr. Jensen is a most excellent internist and Mrs. Jensen a registered nurse. Here we have the ideal combination for focusing the viewpoints of both the doctor and the nurse. An appended list of diets by Drs. Howard A. Rusk, Harold G. Newman and Bruce Kenamore furnishes a basis from which any desired variation may be built: diets for various types of constipation, diabetic diets of graduated caloric content, ulcer diets, and many others.

The book contains over 800 pages, but the paper is thin and of high quality and the actual size of the volume is about that of the average novel. The type is exceptionally clear and easy to read. The delightfully interesting style in which the subject matter is presented will go far toward making it a most popular book in its field. The busy doctor also will find much of interest and instruction, since only the essential and fundamental facts, signs and symptoms are given.

Introduction to Psychobiology and Psychiatry. A Textbook for Nurses. By Esther Loring Richards, M.D., Sc.D., Associate Professor of Psychiatry, Johns Hopkins University School of Medicine. 357 pages. St. Louis: The C. V. Mosby Company, 1941. Cloth $2.50.

This book presents the essentials of normal and abnormal behavior as taught to student nurses in the Henry Phipps Psychiatric Institute of the Johns Hopkins Hospital in Baltimore, Maryland.

The material is divided into sections upon psychobiology and psychopathology. Normal behavior or psychobiology is presented by means of personality study material. The psychopathology is discussed in terms of the ergasias as formulated by Adolph Meyer. Treatment is concisely and ably presented.

This book embodies a condensation of the teachings of Adolph Meyer, former Director of the Phipps Institute. It is an excellent nursing guide for those interested in psychobiology. However, modern concepts of pathologic behavior as presented by the psychoanalytic school are not mentioned either theoretically or therapeutically. For a presentation of the principles of one school of behavior, this book can be recommended to nurses.

L. Emmett Holt: A Biography. By R. L. Duffus and L. Emmett Holt, Jr. 295 pages, illustrated. New York: D. Appleton-Century Co. Cloth $3.00.

Though almost a generation has passed since the death of Dr. Holt, as a pediatrician he needs no biographer, for pediatricians daily find his imprint on their routine work. The authors have skillfully portrayed his private life, his puritanic forbears, his rather modest origin, his early struggles, and his devotion to his church work.

Aside from his teaching, his literary contributions and his professional work, he had time to found or promote nearly every organization connected with child welfare. To him more than any other man or set of men is due the lengthening of the span of human life during the past few decades.

Only three lines in the book (page 105) are objectionable, namely: "Southerners found it difficult to obtain internship [in his hospital] for he had discovered that few of them had ambition compatible with hard work." If he had such a prejudice he certainly did not show it in the lecture room or elsewhere. His personal physician, Dr. Walter James, was from Maryland (Professor of Medicine at College of Physicians and Surgeons). His great life work, still a standard textbook, "Diseases of Infancy and Childhood," was dedicated to Dr. Virgil Gibney of Kentucky. His chief surgical associate in popularizing the operative treatment of pyloric stenosis was Dr. Wm. A. Downes, of North Carolina.

Among the highlights of New York's medical world of his day may be mentioned: J. Marion Sims, South Carolina and Alabama; Jno. A. Wyeth, Alabama; W. Gill Wylie, South Carolina; Wm. T. Bull, South Carolina; W. M. Polk, Tennessee; T. Gallaird Thomas, South Carolina; R. C. M. Page, Virginia; and Simon Baruch, South Carolina. Success such as these men achieved comes only after hard work.

The Therapeutics of Internal Diseases. Volume III. Edited by George Blumer, M.A. (Yale), M.D., David P. Smith, Clinical Professor of Medicine, Yale University School of Medicine. 738 pages, illustrated. New York: D. Appleton-Century Company.

The authors have adhered to the principle of presenting methods of treatment which have been widely accepted by the medical profession. They have not failed, however, to incorporate many newer methods of treatment which have survived the acid test of experience.

Each subject is presented with points on etiology, symptomatology, pathology and diagnosis with particular stress on the various methods used in treating the disease under discussion.

Since the various chapters have been written by men who have made special contributions to our knowledge on each subject, the presentation of each problem has been made concise as well as practical.

The first three chapters are devoted to the Mycoses, Metazoan and Protozoan Diseases, the fourth chapter to the bites of poisonous reptiles and to food intoxications.

Then follow diseases due to physical agents together with treatment of edema, dehydration, acidosis and alkalosis.

There is a comprehensive discussion of preoperative and postoperative treatment. No mention is made here, however, of the kind of anesthetic most suitable in cardiac and other conditions.

The final chapters are devoted to a detailed discussion of treatment of the respiratory tract, of cardiac and circulatory diseases.

Essentials of Gynecology. By Leo Brady, M.D., F.A.C.S., Assistant Professor of Gynecology, University of Maryland, and Ethna Louise Kurtz, R.N., Supervisor, Gynecological Operating Room, Johns Hopkins Hospital, 1935-1940. 257 pages, illustrated. New York: The Macmillan Company, 1941. Cloth $2.75.

The material presented in this text consists of lectures delivered by Dr. Brady to the nurses at University Hospital, Maryland, together with a description of gynecologic nursing procedures as they are carried out at Johns Hopkins Hospital. The subjects of anatomy, physiology and endocrinology are presented simply but accurately and with emphasis upon those aspects which will be of practical importance to the nurse.

An interesting point is made concerning the role of the nurse as a health advisor in the community. The reader is reminded that the nurse, whether she wishes it or not, is frequently approached by her friends and acquaintances in regard to female complaints before a physician is consulted. She is not called upon to make a diagnosis, but she should have sufficient knowledge to be able to distinguish between relatively unimportant symptoms and those calling for investigation by a physician.

The chapter on postoperative complications and that on female urology are particularly good. In the section on operating room technic the fact is brought out that the choice of a particular routine is not so important as the thoroughness with which the chosen routine is followed. Details of technic for both operating room and bedside nursing are given, however, so that the book may be used for reference or as a manual by the student. The physical make-up of the book is attractive. The type is larger than usual and makes for easy reading. The illustrations, while not original, are well selected and, having been done by Max Broedel, add much to the value of the text.

A Manual of Allergy. For General Practitioners. By Milton B. Cohen, M.D., Director of the Asthma, Hay Fever and Allergy Foundation; Visiting Physician in Allergy, St. Alexis Hospital, Cleveland, Ohio. 156 pages, illustrated. New York: Paul B. Hoeber, Inc., 1941. Cloth $2.00.

This little book is presented by Dr. Cohen as primer of allergy for the general practitioner. It is easily readable in an hour or two at the most. The most pertinent criticism would seem to be that in the present age, when education on allergy is extensive, even being found in the daily papers, the book sacrifices thoroughness to brevity. It would seem to be better suited for use with medical students than for practicing physicians. However, any physician desiring a short treatise on allergy will find it interesting and instructive.

Southern Medical News

MEETING OF THE EXECUTIVE COMMITTEE OF THE COUNCIL

The Executive Committee of the Council of the Southern Medical Association met in Birmingham, Saturday afternoon, August 16. Present: Dr. Alphonse McMahon, Chairman, St. Louis, member of the Council from Missouri; Dr. Elmer L. Henderson, Louisville, member of the Council from Kentucky; Dr. Lucien A. LeDoux, New Orleans, member of the Council from Louisiana; and the President, Dr. Paul H. Ringer, Asheville, North Carolina. Sitting with the Committee at its meeting were Dr. E. W. Rucker, Jr., Birmingham, member of the Council from Alabama, and Mr. C. P. Loranz, Birmingham, Secretary, Treasurer and General Manager. The Committee made an inspection of the headquarters office and considered matters to be presented to the Council at its next annual sitting.

The Executive Committee is composed of three members of the Council, the President being an ex-officio member, the members being elected by the Council, one each year for a term of three years, the Committee "to represent the Council between the annual meetings, to consider such matters as would come before the Council and report their findings and conclusions to the Council."

The Southern Medical Association was host to its members in Birmingham and Jefferson County to a luncheon Saturday noon, honoring Dr. Ringer and Dr. LeDoux. Dr. McMahon and Dr. Henderson did not reach Birmingham until early afternoon, too late to be included as honorees at the luncheon.

ALABAMA

The Chattahoochee Valley Medical Association, made up of physicians from Alabama, Georgia and Florida, at its forty-first annual meeting, held recently in Jacksonville, Florida, elected Dr. Herbert E. White, St. Augustine, Florida, President; Dr. D. Henry Poer, Atlanta, Georgia, First Vice-President; Dr. Joseph M. Donald, Birmingham, Second Vice-President; and Dr. Robert B. McIver, Jacksonville, Secretary-Treasurer, reelected. Dr. Gilbert F. Douglas, Birmingham, is Council Chairman, and Dr. Seale Harris, Sr., Birmingham, is a member of the Council. The 1942 tri-state medical seminar will be held in Birmingham in July.

Representing the National Association Foundation for Infantile Paralysis, the following three scientists will study the Walker County epidemic of infantile paralysis as being typical of Alabama: Dr. James Trask and Dr. John R. Paul, of New Haven, Connecticut, and Dr. A. E. Casey, Epidemiologist from Louisiana State University Medical School, New Orleans, Louisiana. Dr. Casey has been studying the situation for some time with Dr. A. C. Jackson, Jasper, Chairman of the Walker County Board of Health.

Dr. W. D. Burkhalter, Associate Director of County Health Work in the State Department of Health of Alabama, Montgomery, has been appointed Health Officer of Shelby County (Tennessee) with headquarters in Memphis.

Dr. Norman Van Wezel, formerly Director of the Montgomery Tuberculosis Sanatorium, announces the opening of his office at 17 Adams Avenue, Montgomery, with practice limited to tuberculosis and diseases of the chest.

Dr. Iva G. Murphy, Eutaw, has been appointed Health Officer of Greene County.

Dr. Elisha M. Moore, Centerville, is Health Officer of Sumter County.

Dr. Rutherford O. Ingham, Athens, has resigned as Health Officer of Limestone County to accept a similar position in Johnson City, Washington County, Tennessee.

Dr. Frank M. Hall, Athens, who has been on leave of absence doing graduate work at Johns Hopkins University, will return as Health Officer of Limestone County.

Dr. Mary Walton, Opelika, has been named Health Officer for Chilton County, succeeding Dr. Robert W. Crowell, Clanton.

Dr. Edwin H. Place, a member of the staff of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Maryland, has been appointed Director of the Division of Industrial Hygiene of the Alabama State Department of Health, succeeding Dr. John R. Cain, Montgomery, who resigned several months ago.

Dr. Joseph Handley Rogers and Miss Catherine Gail Shannon, both of Gadsden, were married recently.

Dr. Edward Huger Roberts, Choccolocco, and Miss Katherine Hall, Chicago, Illinois, were married July 16.

Continued on page 40

OFFICERS 1940-1941

The following is a complete roster of the officers of the Southern Medical Association for 1940-1941, and of associations meeting conjointly with the Southern Medical Association:

President—Dr. Paul H. Ringer, Asheville, North Carolina.

President-Elect—Dr. M. Pinson Neal, Columbia, Missouri.

First Vice-President—Dr. E. Lee Heflin, Louisville, Kentucky.

Second Vice-President—Dr. James R. Bloss, Huntington, West Virginia.

Secretary-Manager (Secretary, Treasurer and General Manager)—Mr. C. P. Loranz, Birmingham, Alabama.

Editor of Journal—Dr. M. Y. Dabney, Birmingham, Alabama.

Associate Editor of Journal—Mrs. Eugenia B. Dabney, Birmingham, Alabama.

Councilors—Dr. Hamilton W. McKay, Chairman, Charlotte, North Carolina; Dr. E. W. Rucker, Jr., Birmingham, Alabama; Dr. S. J. Wolfermann, Fort Smith, Arkansas; Dr. Oscar B. Hunter, Washington, D. C.; Dr. Walter C. Jones, Miami, Florida; Dr. Marion C. Pruitt, Atlanta, Georgia; Dr. E. L. Henderson, Louisville, Kentucky; Dr. Lucien A. LeDoux, New Orleans, Louisiana; Dr. J. Mason Hundley, Jr., Baltimore, Maryland; Dr. William H. Anderson, Booneville, Mississippi; Dr. Alphonse McMahon, St. Louis, Missouri; Dr. Robert M. Anderson, Shawnee, Oklahoma; Dr. J. Warren White, Greenville, South Carolina; Dr. Horton Casparis, Nashville, Tennessee; Dr. Curtice Rosser, Dallas, Texas; Dr. Thomas W. Murrell, Richmond, Virginia; Dr. R. J. Wilkinson, Huntington, West Virginia. Executive Committee: Dr. McMahon, Chairman, Dr. Henderson and Dr. LeDoux.

Board of Trustees (All are Past-Presidents)—Dr. H. Marshall Taylor, Chairman, Jacksonville, Florida; Dr. Fred M. Hodges, Richmond, Virginia; Dr. Frank K. Boland, Atlanta, Georgia; Dr. J. W. Jervey, Greenville, South Carolina; Dr. Walter E. Vest, Huntington, West Virginia; Dr. Arthur T. McCormack, Louisville, Kentucky.

Section on Medicine—Dr. John W. Scott, Chairman, Lexington, Kentucky; Dr. V. P. Sydenstricker, Vice-Chairman, Augusta, Georgia; Dr. Moise D. Levy, Secretary, Houston, Texas.

Section on Pediatrics—Dr. Warren W. Quillian, Chairman, Coral Gables, Florida; Dr. Jean V. Cooke, Vice-Chairman, St. Louis, Missouri; Dr. William Weston, Jr., Secretary, Columbia, South Carolina.

Section on Gastroenterology—Dr. James L. Borland, Chairman, Jacksonville, Florida; Dr. Donovan C. Browne, Vice-Chairman, New Orleans, Louisiana; Dr. Julian M. Ruffin, Secretary, Durham, North Carolina.

Section on Pathology—Dr. A. J. Miller, Chairman, Louisville, Kentucky; Dr. W. R. Mathews, Vice-Chairman, Shreveport, Louisiana; Dr. R. H. Rigdon, Secretary, Memphis, Tennessee.

Section on Neurology and Psychiatry—Dr. David C. Wilson, Chairman, Charlottesville, Virginia; Dr. Theodore A. Watters, Vice-Chairman, New Orleans, Louisiana; Dr. Cobb Pilcher, Secretary, Nashville, Tennessee.

Section on Radiology—Dr. Edwin C. Ernst, Chairman, St. Louis, Missouri; Dr. J. Cash King, Vice-Chairman, Memphis, Tennessee; Dr. W. R. Brooksher, Secretary, Fort Smith, Arkansas.

Section on Dermatology and Syphilology—Dr. Howard King, Chairman, Nashville, Tennessee; Dr. A. H. Conrad, Vice-Chairman, St. Louis, Missouri; Dr. Alan Brown, Secretary, Jacksonville, Florida.

Section on Allergy—Dr. Marion T. Davidson, Chairman, Birmingham, Alabama; Dr. C. Malone Stroud, Vice-Chairman, St. Louis, Missouri; Dr. Clarence K. Weil, Secretary, Montgomery, Alabama.

Section on Surgery—Dr. Claude J. Hunt, Chairman, Kansas City, Missouri; Dr. J. Duffy Hancock, Vice-Chairman, Louisville, Kentucky; Dr. J. A. Crisler, Jr., Secretary, Memphis, Tennessee.

Section on Bone and Joint Surgery—Dr. F. Walter Carruthers, Chairman, Little Rock, Arkansas; Dr. Guy W. Leadbetter, Vice-Chairman, Washington, D. C.; Dr. Winthrop M. Phelps, Secretary, Baltimore, Maryland.

Section on Gynecology—Dr. E. C. Hamblen, Chairman, Durham, North Carolina; Dr. W. O. Johnson, Vice-Chairman, Louisville, Kentucky; Dr. John T. Sanders, Secretary, New Orleans, Louisiana.

Section on Obstetrics—Dr. Joseph W. Reddoch, Chairman, New Orleans, Louisiana; Dr. Robert E. Seibels, Vice-Chairman, Columbia, South Carolina; Dr. R. A. White, Secretary, Asheville, North Carolina.

Section on Urology—Dr. Grayson Carroll, Chairman, St. Louis, Missouri; Dr. Edward H. Ray, Vice-Chairman, Lexington, Kentucky; Dr. Austin I. Dodson, Secretary, Richmond, Virginia.

Section on Proctology—Dr. Frederick B. Campbell, Chairman, Kansas City, Missouri; Dr. Maurice Lescale, Vice-Chairman, New Orleans, Louisiana; Dr. W. K. McIntyre, Secretary, St. Louis, Missouri.

Section on Railway Surgery—Dr. J. J. Brandabur, Chairman, Huntington, West Virginia; Dr. Duncan Eve, Secretary, Nashville, Tennessee.

Section on Ophthalmology and Otolaryngology—Dr. W. Likely Simpson, Chairman, Memphis, Tennessee; Dr. L. Chester McHenry, Chairman-Elect, Oklahoma City, Oklahoma; Dr. Kate Savage Zerfoss, Vice-Chairman, Nashville, Tennessee; Dr. J. W. Jervey, Jr., Secretary, Greenville, South Carolina.

Section on Anesthesia—Dr. George S. Mechling, Chairman, Oklahoma City, Oklahoma; Dr. Russell F. Bonham, Vice-Chairman, Houston, Texas; Dr. Merrill C. Beck, Secretary, New Orleans, Louisiana.

Section on Medical Education and Hospital Training—Dr. Harvey B. Haag, Chairman, Richmond, Virginia; Dr. S. I. Kornhauser, Vice-Chairman, Louisville, Kentucky; Dr. John W. Spies, Secretary, Galveston, Texas.

Section on Public Health—Dr. Henry C. Ricks, Chairman, Jackson, Mississippi; Dr. Harry F. Parker, Vice-Chairman, Warrensburg, Missouri; Dr. Hugh R. Leavell, Secretary, Louisville, Kentucky.

American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. Felix J. Underwood, President, Jackson, Mississippi; Dr. B. F. Wyman, First Vice-President, Columbia, South Carolina; Mr. Richard Messer, Second Vice-President, Richmond, Virginia; Miss Pearl Barclay, Third Vice-President, Montgomery, Alabama; Dr. P. E. Blackerby, Secretary-Treasurer, Louisville, Kentucky.

National Malaria Committee (meeting conjointly with Southern Medical Association)— Dr. L. O. Howard, Honorary Chairman, Washington, D. C.; Dr. J. N. Baker, Chairman, Montgomery, Alabama; Mr. John H. O'Neill, Chairman-Elect, New Orleans, Louisiana; Mr. W. H. W. Komp, Vice-Chairman, Ancon, Canal Zone; Dr. Mark F. Boyd, Secretary-Treasurer, Tallahassee, Florida.

American Society of Tropical Medicine (meeting conjointly with Southern Medical Association)—Dr. Thomas T. Mackie, President, New York, New York; Dr. Ernest Carroll Faust, President-Elect, New Orleans, Louisiana; Dr. Fred L. Soper, Vice-President, Rio de Janeiro, Brazil; Dr. E. Harold Hinman, Secretary-Treasurer, Wilson Dam, Alabama; Dr. Charles F. Craig, Editor, San Antonio, Texas. *American Academy of Tropical Medicine* (meeting conjointly with American Society of Tropical Medicine)—Dr. Marshall A. Barber, President, Savannah, Georgia; Dr. Herbert A. Clark, Vice-President, Panama, R. de P.; Dr. Ernest Carroll Faust, Secretary, New Orleans, Louisiana; Dr. Thomas T. Mackie, Treasurer, New York, New York.

Women Physicians of the Southern Medical Association—Dr. Nora D. Dean, Chairman, Louisville, Kentucky; Dr. Emma Moss, Vice-Chairman, New Orleans, Louisiana; Secretary to be appointed.

Woman's Auxiliary to the Southern Medical Association—Mrs. M. Pinson Neal, President, Columbia, Missouri; Mrs. J. U. Reaves, President-Elect, Mobile, Alabama; Mrs. W. T. Wootten, First Vice-President, Hot Springs, Arkansas; Mrs. Philip E. Blackerby, Second Vice-President, Louisville, Kentucky; Mrs. Floyd F. Kirby, Recording Secretary, Waco, Texas; Mrs. Harvey F. Garrison, Treasurer, Jackson, Mississippi; Mrs. Harry M. Gilkey, Corresponding Secretary, Kansas City, Missouri.

Late Summer and Early Fall

Diarrhea in Infancy

Intestinal disturbances of infants are likely to be as frequent and even more severe now than in early summer.

It is therefore timely to suggest again the following rational and efficient procedure as a means to prevent the development of a serious diarrhea.

Mellin's Food **4 level tablespoons**

Water (boiled, then cooled) **16 ounces**

Give one to three ounces every hour or two until the stools lessen in number and improve in character.

The mixture may then be strengthened by the gradual substitution of boiled skimmed milk for water until the quantity of skimmed milk is equal to the normal quantity of milk used in the baby's formula. Finally the fat of the milk may be gradually replaced by skimming less and less cream from the milk.

Directions for using Mellin's Food are left entirely to the physician.

Samples sent to physicians upon request.

Mellin's Food Company, Boston, Mass.

MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.

University of Georgia School of Medicine

AUGUSTA, GEORGIA

Offers an intensive postgraduate course in

Office Endocrinology

Sept. 15-19, inclusive

The course is limited to 20, and the attendance fee is $25.00. Applications should be sent to Miss Janet Newton, Registrar, accompanied by a $10.00 deposit. For further information apply to the Dean.

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SCHOOL OF MEDICINE

POSTGRADUATE instruction in all branches of medicine is offered to graduate physicians.

TULANE CLINICS — The week of October 20th-October 25th, 1941. The only charge is a $5.00 registration fee.

For detailed information write

Director

Department of Graduate Medicine
1430 Tulane Avenue, New Orleans, La.

ALABAMA—Contiuued from page 1019

DEATHS

Dr. William A. Beason, Ashville, aged 73, died recently of cerebral hemorrhage.

Dr. Benjamin Sidney Chapman, Montgomery, aged 71, died July 15.

Dr. W. W. Faris, Birmingham, died July 24.

Dr. Frank Houston Gardner, Flat Rock, aged 74, died June 6 of uremia following injuries received in an automobile accident.

Dr. R. Berney McNeill, Jemison, aged 68, died June 23 of angina pectoris.

Dr. Eugene C. Lindsey, Florence, aged 67, died August 2 after a heart attack.

Dr. Albert Sidney Pugh, Grove Hill, aged 74, died recently.

Dr. Herbert Carey Walker, Huntsville, aged 43, died recently.

ARKANSAS

University of Arkansas School of Medicine, Little Rock, has purchased fifty milligrams of radium for use in the Tumor Clinic of the University Hospital, the donation for this being a gift of $600 from the Elise A. Lake Foundation, a gift of $600 by the State Hospital for Nervous Diseases, and an additional sum from the School of Medicine.

The Alumni Association of the University of Arkansas School of Medicine has elected Dr. E. A. Callahan, Carlisle, President; Dr. Estes Allen, Little Rock, Vice-President; Dr. T. Duel Brown, Little Rock, Secretary; and Dr. Paul Fulmer, Little Rock, Treasurer.

Dr. K. T. Mosley, who recently completed a course in public health at Harvard University, has been assigned as Assistant to Dr. T. T. Ross in the office of the State Board of Health, Little Rock.

Dr. E. I. Easley, formerly of Texarkana, has been appointed Director of Venereal Disease Control, extra-cantonment area, at Little Rock.

Dr. W. A. Moore has been elected Surgeon of the Rogers Post of the American Legion.

The following have been appointed as examiners for Selective Service: Desha County, Dr. C. H. Kimbro, Tillar; and Dr. Gibbs Biscoe, Dumas; Hot Springs County, Dr. W. G. Hodges, Malvern; Dr. H. L. Brown, Malvern; and Dr. W. F. Barrier, Malvern.

Dr. J. W. Amis, Fort Smith, has been ordered to active duty as Lieut.-Com., Medical Corps, U. S. Navy, and assigned to the recruiting office at Salt Lake City.

Dr. H. E. Murry, Texarkana, Dr. R. B. Robins, Camden, and Dr. John Wilson, Magnolia, recently took postgraduate work in surgery at Harvard Medical School.

Dr. A. S. J. Clark, formerly of Ozark, has been transferred to Monticello as Director of the Drew County Health Unit.

Dr. M. G. Lawson, formerly of Benton, has been transferred to Texarkana as Director of the Miller County Health Unit.

Dr. J. E. Little has accepted appointment at Camp Alton, CCC, Hope.

The following have been elected in their respective posts of the American Legion: Dr. J. B. Hesterly, Prescott, Surgeon; Dr. L. M. Lile, Hope, Surgeon; Dr. H. G. Heller, Mena, Surgeon; and Dr. B. H. Hawkins, Mena, Child Welfare Chairman.

Dr. Ralph E. Weddington, Batesville, has been appointed Civilian Co-ordinator of Public Health for the Army maneuvers in south Arkansas.

Dr. E. Baker has been elected Surgeon of the Dermott Post of the American Legion.

Dr. Hoyt R. Allen, Little Rock, recently took special work at the Mayo Clinic.

Dr. F. A. Boomer, Mulberry, has been appointed Crawford County Health Physician.

Dr. C. C. Reed, Jr., Little Rock, has been appointed Deputy Coroner for Pulaski County.

Dr. H. King Wade has been elected President of the Hot Springs National Park Chamber of Commerce.

Dr. Benford Hawkins, formerly at State Hospital, Little Rock, has accepted an appointment with the Veterans' Administration Facility, Palo Alto, California.

Dr. J. W. Butts and Dr. Geo. R. Storms have been elected Surgeons of the Helena Post of the American Legion.

Dr. B. M. Stevenson, West Memphis, has been transferred to the El Dorado Health Unit for the duration of the south Arkansas army games.

Dr. Mary Ruth Brittain, Conway, and Dr. B. E. Pickett, Jr., Carrizo Springs, Texas, were married June 29.

Dr. J. N. Compton, Little Rock, and Miss Margaret Ann Lake, Gould, were married June 3.

Dr. R. J. Haley, Jr., and Miss Ethel Brewer, both of Paragould, were married June 4.

Continued on page 42

KARO FORMULAS FOR PREMATURE AND DEBILITATED INFANTS

DILUTE MIXTURES

Evaporated milk..... 4 ozs.
Water, boiled.....12 ozs.
Karo..... 1 tbs.
2 ozs. every 3 hrs. for 8 feedings

Lactic Acid milk (dried) 5 tbs.
Water, boiled.....16 ozs.
Karo.....1½ tbs.
2 ozs. every 3 hrs. for 8 feedings

CONCENTRATED MIXTURES

Breast milk.....12 ozs.
Evaporated milk..... 4 ozs.
Karo..... 1 tbs.
2 ozs. every 3 hrs. for 8 feedings

Lactic Acid milk (2%)..16 ozs.
Karo..... 2 tbs.
2 ozs. every 3 hrs. for 8 feedings

FEEDING PROGRESS

Days of Age	Drams at Each Feeding	Ounces of Feeding per 24 Hrs.
1	1	1
2	2	2
3	4	4
4	6	6
5	8	8
6	10	10
7	12	12

(8 drams = 1 ounce)

Premature usually thrive on Karo formulas

"MOST of the common milk mixtures have been used at various times with some degree of success —evaporated, acid and dried milks, and butter-flour mixtures. Those high in protein and carbohydrate and low in fat are the most suitable in concentrated formulas properly adapted to the limited digestive capacity of the premature. While lactic-acid milk with addition of 7 to 10 per cent by volume of Karo syrup yields twenty-five to thirty calories per ounce, evaporated milk with 5 to 10 per cent added Karo syrup is equally effective.

Processed or acid milks are advantageous because of the fine curds produced, the premature being particularly susceptible to curd indigestion. Nonfermentable carbohydrate in quantities similar to those used in normal feeding of infants may be added to any of these milks. The formula may be concentrated by decreasing the water, or adding powdered protein milk in place of extra amounts of sugar."

KUGELMASS:
"Newer Nutrition in Pediatric Practice."

CORN PRODUCTS SALES COMPANY
17 Battery Place, New York City

Continued from page 40

DEATHS

Dr. William Clare Green, Little Rock, aged 72, died June 17.
Dr. John R. May, Little Rock, aged 57, died in June.
Dr. James M. Sheppard, El Dorado, aged 77, died June 9 of myocarditis and nephritis.
Dr. Frederick William Youmans, Lewisville, aged 72, died recently of thrombosis.

DISTRICT OF COLUMBIA

George Washington University School of Medicine, Washington, has continued its regular course through the summer for about 40 per cent of the incoming senior class, which will permit them to graduate in February of 1942, this in the interests of national defense.

Dr. William Thornwall Davis, Professor of Ophthalmology at George Washington University School of Medicine, Washington, was among the distinguished graduates of George Washington University to receive Alumni Achievement Awards at the graduation exercises in June and was honored at a reception immediately following the annual meeting of the General Alumni Association.

Dr. J. Winthrop Peabody, Washington, has been elected President-Elect of the American College of Chest Physicians. He is Professor of Respiratory Diseases at Georgetown University School of Medicine, Chief Visiting Consultant at Glenn Dale Sanitarium, President of the District of Columbia Tuberculosis Association, and a member of the Board of Directors of the National Tuberculosis Association.

Dr. Robert H. Harmon, Washington, was reelected President and Dr. William Earl Clark, Washington, Vice-President, representing the School of Medicine at the annual meeting of the General Alumni Association of George Washington University.

Dr. Philip Caulfield, Washington, has been appointed as liaison officer to cooperate with the American Red Cross.

Dr. Edwin R. Gookin, Washington, has been appointed a member of the Committee of Awards for Meritorious Service, Police and Fire Departments, to fill the vacancy caused by the death of Dr. Henry C. Stein.

The Surgeon General of the U. S. Navy has announced that the next examinations for entrance into the regular Navy as commissioned officers in the Medical Corps will be held for Acting Assistant Surgeon (Intern) on October 6, 1941, and January 5, 1942, and for Assistant Surgeon on the same dates.

American Association for the Study of Neoplastic Diseases, Washington, will meet in Washington September 4-6. Dr. Eugene R. Whitmore, Washington, is Secretary.

The Section on Mental Health Methods of the U. S. Public Health Service operates a survey service for mental hospitals and assists in the establishment of state mental hygiene-public health programs. Miss Mary E. Corcoran, former Superintendent of Nurses at the New Jersey State Hospital at Greystone Park, has accepted the position as psychiatric nursing consultant to the staff of the Section on Mental Health Methods.

DEATHS

Dr. Thomas Ash Claytor, Washington, aged 72, died June 4 of pneumonia.
Dr. William Henry Syme, Washington, aged 70, died June 6.

FLORIDA

Dr. Herbert E. White, St. Augustine, was elected President of the Chattahoochee Valley Medical Association at its recent annual meeting in Jacksonville, and Dr. Robert B. McIver, Jacksonville, was reelected Secretary-Treasurer.

Dr. Jack B. Eason, formerly Director of the Maternal and Child Health Division of the Arizona State Board of Health, Phoenix, has been appointed Director of the Lake County Health Department, succeeding Dr. Arthur W. Newitt, Tavares, who has been named Director of the Bureau of Local Health Service of the State Board of Health.

Dr. Edward R. Annis, Tallahassee, and Miss Betty Starck, Miami, were married June 16.

DEATHS

Dr. Shuler Hardin Etheridge, Tampa, aged 42, died June 10.
Dr. Charles E. Coffin, Winter Park, aged 76, died June 9.
Dr. William Franklin Cross, Miami, aged 61, died recently.
Dr. William Beach Hewett, St. Petersburg, aged 89, died recently of coronary occlusion.
Dr. Garrett Van der Veer Johnson, Lake City, aged 68, died June 10 of coronary occlusion.
Dr. William Saunderson Yeager, Georgiana, aged 53, died recently of valvular heart disease.

Continued on page 44

THE NEW YORK POLYCLINIC
MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)
THE PIONEER POST-GRADUATE MEDICAL INSTITUTION IN AMERICA

For the General Surgeon

A combined surgical course comprising general surgery, traumatic surgery, abdominal surgery, gastroenterology, proctology, gynecological surgery, urological surgery. Attendance at lectures, witnessing operations, examination of patients pre-operatively and post-operatively and follow-up in the wards postoperatively. Pathology, roentgenology, physical therapy. Cadaver demonstrations in surgical anatomy, thoracic surgery, regional anesthesia. Operative surgery and operative gynecology on the cadaver.

Obstetrics and Gynecology

A full time course. In Obstetrics: Lectures; prenatal clinics; witnessing normal and operative deliveries; operative obstetrics (manikin). In Gynecology: Lectures; touch clinics; witnessing operations; examination of patients pre-operatively; follow-up in wards post-operatively. Obstetrical and Gynecological pathology; regional anesthesia (cadaver). Attendance at conferences in Obstetrics and Gynecology. Operative Gynecology on the Cadaver.

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PROVIDE *the Arthritic Patient* *with* RELIEF FROM PAIN . . .

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A-B-M-C OINTMENT

(ACETYL-BETA-METHYLCHOLINE CHLORIDE)

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A-B-M-C Ointment* relieves arthritic pain because of its local action in increasing the blood supply to the affected part by dilatation of the arterioles and capillaries.

In 88 percent of 96 patients studied, A-B-M-C Ointment provided relief from pain without any untoward effects when used as directed. No urticaria was produced in any case.†

A-B-M-C Ointment is spread, without rubbing, on the affected part and heat is applied for 20 minutes.

Supplied in 1-ounce tubes

†Archives of Physical Therapy, *21*, 12 (Jan.), 1940.

**A-B-M-C Ointment is a trademark of John Wyeth & Brother, Incorporated, for its brand of ointment containing Acetyl-Beta-Methylcholine Chloride 0.25%, menthol, thymol, eucalyptol and methyl salicylate in an emollient base.*

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SAMPLES AND LITERATURE ON REQUEST

John Wyeth & Brother, Inc., Philadelphia

Continued from page 42

GEORGIA

University of Georgia School of Medicine, Augusta, is offering an intensive postgraduate course in Office Endocrinology for the week of September 15, the course being given by Dr. Robert B. Greenblatt.

Emory University School of Medicine, Atlanta, has a new research laboratory in the Department of Ophthalmology, this being established permanently for Grady Hospital, but its facilities will be available to other physicians. Mr. L. F. Montgomery, Atlanta, is the donor of this research laboratory.

Work was recently begun on the new Academy of Medicine, Atlanta, which will house the offices of the Fulton County Medical Society, owners of the building, the Medical Service Bureau, the Medical Association of Georgia, and the county medical society's library and museum. Its auditorium will seat 325 persons and the building will have kitchen, dining room and lounges. Plans call for an expenditure of more than $100,000 for the building.

The John and Mary R. Markle Foundation, New York City, has made a grant of $5,000 to supplement the one for $6,000 made last year for research work in nutritional diseases under the direction of Dr. V. P. Sydenstricker, Professor of Medicine, University of Georgia School of Medicine, Augusta.

Dr. D. Henry Poer, Atlanta, was elected First Vice-President of the Chattahoochee Valley Medical Association at its recent annual meeting.

Chicago Eye, Ear, Nose & Throat College
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231 W. Washington St., Chicago, Ill.
Practical postgraduate course in Ophthalmology and Otolaryngology.
Doctors admitted at any time for review and clinical observation.
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Courses for Graduates
FRACTURE COURSE FOR GRADUATES
By the Fracture Clinic of the Massachusetts General Hospital
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(*Week preceding Congress of the American College of Surgeons in Boston*)
Fee, $75
DIAGNOSIS AND TREATMENT OF INJURIES TO THE BRAIN AND SPINAL CORD AND THEIR COVERINGS
November 10-15, inclusive
By Dr. Donald Munro and Associates at the Boston City Hospital
Fee, $40
DISEASES OF THE COLON AND RECTUM
November 17-22, inclusive
By Dr. E. Parker Hayden and Associates at the Massachusetts General Hospital
Fee, $50
For further information, apply to
Assistant Dean, Courses for Graduates,
HARVARD MEDICAL SCHOOL
Boston, Massachusetts

Dr. John M. Walton, Atlanta, has been appointed State Venereal Disease Control Officer, succeeding Dr. Aaron Wilson Brown.

The Executive Committee of the Southeastern Surgical Congress has announced that the next meeting of the Congress will be held in Atlanta March 9-11, 1942, instead of in Jackson, Mississippi, as previously announced.

Dr. Frank K. Boland, Atlanta, has been elected President of the Emory University Alumni Association.

Dr. James J. Clark, Atlanta, was elected Vice-President of the American College of Radiology at the recent annual meeting in Cleveland.

Dr. Arthur J. Merrill, Atlanta, was elected Vice-President of the American Federation for Clinical Research, which was organized recently at Atlantic City.

Dr. D. H. Garrison, Clarksville, has been appointed Vice-Councilor for the Ninth District, and Dr. J. Victor Roule, Augusta, Vice-Councilor for the Tenth District.

Dr. John M. McGehee, Cedartown, has been elected to fellowship in the American College of Surgeons.

Dr. F. C. Nesbit, with offices in the Candler Building, Atlanta, for many years, has moved to Covington and will continue the practice of medicine there.

Dr. James J. Clark, Dr. William P. Baker, Dr. William P. Elkin, Dr. William F. Lake and Dr. Jackson W. Landham, all of Atlanta, attended a National Defense Conference of the Radiological Society of North America in San Francisco recently.

Dr. Charles A. Willis, Bainbridge, and Miss Jule Wilson, Montgomery, Alabama, were married recently.

Dr. Charles Paine, Jr., and Miss Mary Halbrook, both of Atlanta, were married in June.

DEATHS

Dr. Pleasant Henry Askew, Jr., Nashville, aged 31, died recently in an automobile accident.

Dr. Joseph Warren Bailey, Rossville, aged 75, died recently.

Dr. Robert Irvine Bryson, Augusta, aged 55, died June 4 of coronary thrombosis and chronic cholecystitis.

Dr. James Richard Clements, Pelham, aged 65, died recently of myocarditis.

Dr. James Hiram Hasty, Atlanta, aged 61, died June 6 of arteriosclerosis and heart disease.

Dr. James Henry Johnson, Columbus, aged 75, died recently of coronary thrombosis.

Dr. William Herman Myers, Savannah, aged 62, died July 17 of coronary thrombosis.

Dr. Hugh McCulloch, Sr., West Point, aged 68, died recently of angina pectoris.

Dr. Richard Franklin Slaughter, Jr., Augusta, aged 35, died July 4.

KENTUCKY

Kentucky State Medical Association will hold its next annual meeting at Louisville, Brown Hotel, September 29-October 3.

The Association of Military Surgeons will be held at Louisville and at Fort Knox, October 29-November 1.

Trigg County Medical Society was organized in Cadiz July 22, with Dr. George E. Hatcher, Cerulean, as President, and Dr. Elias Futrell, Cadiz, Secretary.

Second Councilor District of the Kentucky State Medical Association was organized recently and the following officers elected: Dr. E. Dargan Smith, Owensboro, President, and Dr. Gaithel L. Simpson, Greenville, Secretary.

The American Red Cross has established a twenty-five-bed emergency hospital in a school building at Columbia, Adair County, to serve as an isolation unit in the epidemic of Shiga dysentery. About a hundred cases have been reported with twelve deaths, children being the chief victims.

Dr. A. A. Shaper, Louisville, has returned from a trip around the globe, having served as ship surgeon on the S. S. President Garfield. He visited numerous hospitals in Japan, China, India, Philippines, South Africa, and studied their medical problems.

Dr. Fred W. Rankin, Lexington, President-Elect of the American Medical Association, was recently honored at a banquet given by the Fayette County Medical Society at the Lexington Country Club. Dr. Charles H. McKinlay, Lexington, President of the County Medical Society, presided, and guests included Dr. Harrison H. Shoulders, Nashville, Tennessee, Speaker of the House of Delegates of the American Medical Association; Dr. Elmer L. Henderson, Louisville, Trustee; Dr. Irvin Abell, Louisville, Past President; Dr. James Duffy Hancock, Louisville, a member of the House of Delegates; and Dr. Arthur T. McCormack, State Health Commissioner and member of the House of Delegates, Louisville.

Dr. T. Hunt Jones, Eminence, has been called to the U. S. Marine Service and is stationed at San Diego, California.

Continued on page 46

VEGEX-VITAFOOD DRIED BREWERS YEAST

WAS AND STILL IS THE OUTSTANDING SOURCE OF THE FULL VITAMIN B COMPLEX SUPPLYING THE FULL OF GOLDBERGER'S P-P (PELLAGRA-PREVENTIVE) FACTOR

Since the Mississippi flood in 1928, Vegex-Vitafood Dried Brewers' Yeast has increasingly become the outstanding source of Goldberger's P-P (pellagra-preventive) factor, particularly among health departments and physicians.

Initially, the President of the Company, with a long experience in food and drug administration, the author of one of the first, if not the first, of the laws against medical advertising frauds, determined to and did place the use of this yeast entirely under the direction of physicians and health departments. It has been, with the physician's other treatment, a dependable aid in lowering the pellagra death rate as comparative vital statistics are showing.

And Then

Another outstanding thing has been done. It has been demonstrated that when a product is supplied at a price which people of low incomes can pay, supplied through the wholesaler and retailer and then all treatment directed to the neighborhood physician and health department, a fatal scourge, even during the depression, through the private practitioner, is being conquered.

The Two Types

There are two types of Vegex-Vitafood Dried Brewers' Yeast, the Red Label has the hop flavor removed; the Green Label retains the hop flavor. Both types are packed in one-half pound, one, two and five pound cans or fifty and one hundred pound bags.

This yeast assays 50 International B^1 units per gram and 40 Sherman-Bourquin B^2G (riboflavin) units per gram and supplies the whole of the vitamin B complex. It is high in Goldberger's P-P (pellagra-preventive) factor including the nicotinic acid fraction.

Suggested Administration

A simple and satisfactory way for administration is a tablespoonful stirred into a glass of cold water. The debittered type is furnished in 6 grain tablet form. However, in pellagra, the powder is preferable since the daily dose would require from thirty to sixty tablets.

Vegex

Vegex is the condensed extract of approximately the whole contents of the yeast cell in a more palatable and more available form. It is meat-like in flavor—but meat free—giving wide and tasty food uses. The simplest way of serving Vegex is to dissolve a scant teaspoonful of the paste into a cup of hot water—chill in summer—or hot milk.

●

Samples for clinical or professional use will be sent on request.

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Continued from page 44

Dr. Lenore V. L. Patrick, Williamstown, has resigned as Health Officer of Grant County to take a position as Pediatric Consultant to the Wisconsin State Board of Health in Madison.

Dr. Adam Stacy, Jr., Pineville, has resigned as Health Officer of Bell County to enter private practice.

Dr. Joseph Scott Goodpastor, Owingsville, has resigned as Health Officer of Bath County to enter private practice, and the health unit has been discontinued.

Dr. L. O. Toomey, Bowling Green, has been named NYA Medical Examiner for Bowling Green and Warren County.

Dr. Charles Hugh Maguire and Miss Sherley Chapman Jenkins, both of Louisville, were married July 2.

Dr. John Ralph Rice and Miss Helen Norine Ward, both of Elkton, were married recently.

Dr. John Robert Hilsenbeck, Jenkins, and Miss Florence Burns, Milligan College, Tennessee, were married June 19.

Deaths

Dr. William Thomas Bruner, Louisville, aged 70, died June 3.

Dr. John Reed Brosheer, Middlesboro, aged 28, was killed recently in an airplane accident while on an army training flight.

Dr. William Calvin Ussery, Paris, aged 80, died recently.

Dr. Frank D. Crigler, Ludlow, aged 83, died June 13 of cholecystitis, postoperative peritonitis, arteriosclerosis and myocarditis.

Dr. W. G. Dailey, Millersburg, aged 81, died July 3.

Dr. Curtis Lewis Hancock, Lexington, aged 58, died recently.

Dr. John G. Tye, Barbourville, aged 60, died June 21.

Dr. Elwood Wand, Woodbury, aged 84, died recently.

Dr. Otis Fillmore Miller, Danville, aged 76, died June 9.

Dr. Harry S. Swope, Ashland, aged 65, died June 23 of coronary occlusion.

Dr. Gordon Ezra Woodruff, Louisville, aged 29, was killed recently near Accra, West Africa, while in action.

Dr. William Franklin Watkins, Maywood, aged 88, died recently of epithelioma of the face and neck.

Dr. Charles H. Hunt, Louisville, aged 80, died July 17 of uremia.

LOUISIANA

The Department of Graduate Medicine, Tulane University School of Medicine, New Orleans, will have a graduate course in tropical medicine and medical parasitology to extend through the first half of the year. It is open to properly qualified American physicians and adequately trained physicians in Latin America and other parts of the world. Additional information may be obtained from the Director, Department of Graduate Medicine, Tulane University of Louisiana School of Medicine, 1430 Tulane Avenue, New Orleans.

The Louisiana State Council for the Coordination of Health, Welfare and Recreational Activities in National Defense was organized in the offices of Welfare Director Dr. W. S. Terry, Jr., Baton Rouge, July 3.

Tulane University School of Medicine, New Orleans, will receive Federal funds to carry on research in the field of malaria control and Charity Hospital, New Orleans, for research in the use of sulfanilamide compounds in treating infections resulting from wounds and burns. Funds will also be allotted to Tulane for work on malaria control and mosquito control and for the study of roentgen therapy in gas gangrene.

New Orleans Gynecological and Obstetrical Society's new officers are: Dr. Lucien A. LeDoux, President; Dr. J. W. Reddoch, Vice-President; Dr. E. C. Smith, Second Vice-President; Dr. E. H. Countiss, Secretary; and Dr. H. B. Alsobrook, Treasurer, all of New Orleans.

Dr. Rudolph Matas, New Orleans, was presented the jewel of the Order of Carlos J. Finlay as the sole surviving member of the famous Chaille Yellow Fever Commission at ceremonies during the Lions International convention in July.

Dr. Ernest Carroll Faust, New Orleans, was recently appointed Instructor at the Army Medical School in Washington to assist in a special course on tropical diseases.

Dr. Ralph Hopkins, New Orleans, was elected Vice-President of the American Dermatological Association at its annual meeting in New Orleans in April.

The sixth annual postgraduate course for Negro physicians was presented at the Flint-Goodridge Hospital of Dillard University, New Orleans, recently.

Dr. Julian Graubarth, New Orleans, President of the Lou-

Continued on page 48

Decholin

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and the THERAPEUTIC VALUE *of* INCREASED BILIARY FLOW

In the treatment of chronic cholecystitis, noncalculous cholangitis, and biliary engorgement, an increase in the quantity and rate of bile flow washes out inspissated, stagnant accumulations. Nidi of infection, if present, are also removed.

Decholin, chemically pure dehydrocholic (triketocholanic) acid, through its choleretic action increases secretion of bile by the liver cells as much as 200 per cent, and enhances gallbladder evacuation. Thus drainage from the entire tract is encouraged, leading to relief from the associated subjective discomfort and usually to objective improvement. ***Decholin*** is also employed in biliary dyskinesia and for the removal of common duct stones overlooked at surgery. It is contraindicated in total obstruction of the common or hepatic bile duct.

Physicians are invited to request the third edition of "Biliary Tract Disturbances," which discusses in detail the wide therapeutic applicability of ***Decholin.***

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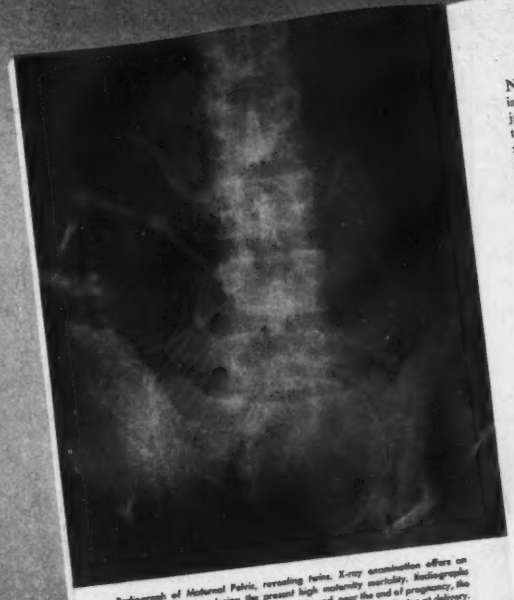

Radiograph of Maternal Pelvis, revealing twins. X-ray examination offers an effective means to reducing the present high maternity mortality. Radiographs reveal the size and shape of the female pelvis, and, near the end of pregnancy, the number, size, and position of the babies—so chance is a minor factor at delivery.

32

HAVING BABIES

NO doctor, of course, would insist that every woman who is going to have a baby should have herself x-rayed. But just the same, in the last few years, the x-rays have saved the lives of thousands of babies and mothers. An early x-ray examination can tell a doctor just how big the mother's pelvis is and whether it is perfectly normal. If it should be deformed in some way so that it would be impossible for the baby to be born normally, the x-rays would make it possible for the doctor to plan from the first on a cesarean operation and often, this way, give the mother a fine healthy child that might otherwise not have been born at all.

An x-ray examination shortly before it is time for the baby to be born is essential if the doctor suspects something abnormal about the baby's position—face first, for instance, or feet first instead of head first. It gives him a chance to work out his plan of campaign beforehand, as it were, instead of having to change his whole tactics when he's greeted by a tiny foot instead of a tiny head.

But the most important use of the x-rays when it comes to babies is in detecting twins. Any mother wants to have a little warning of twins if only so as to have a chance to get two layettes. And the doctor is even more anxious to know about twins beforehand, for twins are a good deal more than twice as hard to deliver as a single baby . . . and in medicine, more than almost anywhere else, forewarned is forearmed.

X-RAYS AND YOUR CHILDREN

THERE are dozens of ways the x-rays can help the pediatrician help you to bring your baby up into a fine healthy

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Send me, free, ____ copies of "X-rays and You"; address package as printed below:

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Continued from page 46

isiana Pediatric Society, has been appointed State Chairman for Louisiana of the American Academy of Pediatrics, succeeding Dr. Robert A. Strong, resigned.

Dr. Walter J. Otis, New Orleans, was made a Fellow of the American Association on Mental Deficiency at the 65th annual meeting of this organization, held recently in Salt Lake City.

Dr. T. A. Watters, New Orleans, attended the sixteenth seminar of the Committee on Cultural Relations with Latin America, recently held at Mexico City.

Dr. James T. Nix, New Orleans, delivered the baccalaureate address at the 87th commencement exercises of St. Stanislaus College.

Dr. A. J. Hockett, New Orleans, was recently appointed Chairman of the American Hospital Association's Committee on Physical Defense of Civilian Hospitals.

Dr. H. L. Kearney, New Orleans, has been elected to active membership in the American Broncho-Esophagological Association.

Dr. Francis J. Jaubert, New Orleans, and Dr. Dudley M. Stewart, formerly of New Orleans, were elected members of the Grand Council of the Phi Rho Sigma Medical Fraternity at the annual meeting held at Lake Wawasee, Indiana, recently.

The following physicians of the United States Public Health Service have been relieved from duty in New Orleans: Assistant Surgeon Charles L. Williams, Jr., ordered to proceed to Raleigh, North Carolina, for duty in the State Health Department; Assistant Surgeon Llewellyn E. Kling to the Municipal Health Department, Omaha, Nebraska, for duty; Assistant Surgeon George E. Parkhurst to proceed for duty at Johns Hopkins Hospital, Baltimore; Assistant Surgeon G. Wetterstroem and Assistant Surgeon Edward C. Budd to Washington, D. C.

Dr. Wm. H. Gordon, U. S. Public Health Service, has arrived in New Orleans for duty at the U. S. Marine Hospital.

Acting Assistant Surgeon Harold Whitted has been ordered to New Orleans for duty in the U. S. Public Health Service.

Acting Assistant Surgeon Claude G. Eccles, U. S. Public Health Service, has been ordered to the U. S. Marine Hospital at Carville for medical duty to replace Acting Assistant Surgeon Sam Black, who has been ordered to Memphis, Tennessee.

Dr. Margaret E. Strange, New Orleans, and Dr. William Lamar Bryan, Jr., Conway, South Carolina, were married recently.

Dr. Vernon Boulter Beam, Baton Rouge, and Miss Malcolm Thompson, New Orleans, were married recently.

Deaths

Dr. Joseph T. Abshire, Kaplan, aged 73, died June 22 of heart disease.

Dr. Josiah L. Barge, Gretna, aged 82, died recently.

Dr. Arthur Caire, Sr., New Orleans, aged 73, died July 16.

Dr. John James Haydel, Plaucheville, died June 25.

Dr. Andrew Jackson Heflin, Oberlin, aged 65, died June 14 of coronary thrombosis.

Dr. Ludwig Cochran Heintz, Covington, aged 55, died recently of bronchopneumonia.

Dr. Joseph L. Leopold, Grand Cane, aged 76, died recently.

Dr. Douglas Culpepper McBride, Alexandria, aged 48, died June 13 of cerebral hemorrhage.

Dr. Amos Morris Peters, Alexandria, aged 63, died June 19 of pyelitis and pneumonia.

Dr. Joseph G. Stulb, New Orleans, aged 68, died recently of carcinoma of the bladder.

Dr. Luther Archibald Youngs, Paradis, aged 63, died June 15.

MARYLAND

Medical and Chirurgical Faculty of Maryland at its annual meeting elected Dr. Robert Lee Hall, Pocomoke City, President; Dr. Maurice C. Pincoffs, Baltimore, Dr. William F. Williams, Cumberland, and Dr. Jacob W. Bird, Sandy Spring, Vice-Presidents; Dr. Richard T. Shackelford, Baltimore, Secretary; and Dr. Joseph Albert Chatard, Baltimore, Treasurer.

National Recreation Congress, twenty-sixth session, will be held at the Lord Baltimore Hotel in Baltimore, September 29-October 3. This program will include discussion of recreation for men in military service and recreation as a factor in civilian defense.

Dr. John M. T. Finney, Emeritus Professor of Surgery, Johns Hopkins University School of Medicine, Baltimore, was recently awarded the honorary degree of doctor of letters by Jefferson Medical College, Philadelphia.

Dr. Warfield T. Longcope, Professor and Director of the Department of Medicine at Johns Hopkins, recently received the degree of doctor of science from the University of Rochester, Rochester, New York.

Continued on page 50

Sharp & Dohme presents
another triumph of
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SULFADIAZINE

(2-SULFANILAMIDOPYRIMIDINE)

The Research Laboratories of Sharp & Dohme have pioneered in the synthesis and study of pyrimidine derivatives of sulfanilamide.

Following extensive studies, Sulfadiazine, a member of this series of compounds, is now available for general distribution to physicians and hospitals. The laboratory and clinical studies on this new chemotherapeutic agent demonstrate that it is exceedingly effective against pneumococcal infections and that it possesses the following clinical advantages:

1. Preliminary experience suggests low degree of toxicity. **2.** Lower incidence of nausea or vomiting. **3.** High blood concentrations, early and rapidly attained by oral administration. **4.** Lower ratio of acetylated sulfadiazine to free sulfadiazine in the circulating blood; acetylsulfadiazine is more soluble than the free sulfadiazine. **5.** Blood levels decline gradually following discontinuance of the drug. **6.** Significant concentrations occur in ascitic or pleural fluids, and the cerebrospinal fluid.

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Sulfadiazine (2-sulfanilamidopyrimidine), Sharp & Dohme, is supplied in 0.5 Gm. tablets (slotted), in bottles of 50, 100 and 1,000.

Continued from page 48

DEATHS

Dr. John Joseph Heck, Baltimore, aged 61, died recently of arteriosclerosis and heart disease.

Dr. Rastus Ransom Norris, Crisfield, aged 59, died June 9 of angina pectoris.

Dr. Edward Wilson Sickel, Baltimore, aged 42, died recently of chronic nephritis.

Dr. Amelia Viola Zimmerman, Baltimore, aged 69, died recently of arteriosclerosis, hypertension and myocarditis.

MISSISSIPPI

The Executive Committee of the Southeastern Surgical Congress has announced that the next meeting of the Congress will be held in Atlanta, Georgia, March 9-11, 1942, instead of in Jackson as previously announced.

Dr. Ross E. Anderson, Jackson, was recently granted a certificate from the American Board of Otolaryngology at a meeting in Cleveland. This is the highest rating board for specialties in eye, ear, nose and throat.

Dr. Daniel J. Williams, Gulfport, Health Officer of Harrison County since the unit was first established twenty-six years ago, retired June 30 on the expiration of his term. He is succeeded by Dr. Everett W. Ryan, Charleston, Health Officer of Tallahatchie County. It is reported that Dr. Williams is the oldest public health service county unit director in the United States in point of continuous service.

Dr. Isaac C. Knox, Jr., Vicksburg, and Miss Emmette Brown, Birmingham, Alabama, were married in June.

DEATHS

Dr. R. C. Elmore, Durant, aged 64, died July 26.

Dr. John C. Goudelock, Keownville, aged 58, died July 24 of a heart attack.

Dr. A. G. Touchstone, Meridian, aged 57, died July 21.

MISSOURI

Plans are being made for a $450,000 Health Center addition to the St. Louis County Hospital. The building will be added on the south of the present hospital and will accommodate the administrative offices of the hospital and of the health departments, clinics, laboratories, conference rooms and eighty additional beds.

Members of a representative Health and Hospital Advisory Committee recently appointed by the Mayor of St. Louis to obtain recommendations for appointments to major health, hospital and institutional positions are: Dr. Joseph C. Peden, President, St. Louis Medical Society; Dr. Alphonse M. Schwitalla, S. J., Dean of the St. Louis University School of Medicine; Dr. Frank R. Bradley, Superintendent of Barnes Hospital; Dr. Philip A. Shaffer, Ph.D., Dean, Washington University School of Medicine; Dr. M. J. Mohler, President, St. Louis Hospital Council; and Dr. Arthur N. Vaughn (colored), President of the National Medical Association.

Dr. Joseph A. Prichard, Overland, Dr. William H. Townsend, Maplewood, and Dr. John W. Pickel, Kirkwood, having completed fifty or more years in the practice of medicine, were honored at a recent meeting of the St. Louis County Medical Society, each being presented with a key from the Society as a token of appreciation, honor and esteem.

Dr. Ernest Sachs, Professor of Clinical Neurologic Surgery, Washington University School of Medicine, St. Louis, has been elected an honorary member of the Royal Society of Medicine of England.

Dr. James W. Chapman, Jefferson City, was recently chosen President of the Missouri Public Health Association.

Dr. Edward G. McGavran, formerly Health Officer of Monongalia County (West Virginia) and Director of a health training center of the State Health Department at Morgantown, West Virginia, has been appointed Health Officer of St. Louis County, succeeding Dr. Theodore R. Meyer, who had served since 1936. Dr. Meyer has entered active service in the U. S. Navy at Corpus Christi, Texas.

Dr. Daniel L. Sexton, St. Louis, and Miss Mildred Kathryn Hughes, New York, New York, were married August 21.

DEATHS

Dr. M. George Gorin, St. Louis, aged 70, died June 27.

Dr. Harden T. Leach, Elston, aged 76, died recently.

Dr. Ernest W. Oelfcken, St. Louis, aged 70, died recently.

Continued on page 52

PLASTIGUT

A New Universal Suture

truly non-reactive, non-capillary, guaranteed physiologically inert

An approach toward the ideal suture material is found in Plastigut Surgical Sutures, clinically developed by Dr. Joseph E. Bellas of Peoria. Plastigut is composed of synthetic plastic materials especially chosen with regard to suture requirements. Histological and clinical evidence proves it nonreactive, noncapillary and nonabsorbable. At any given stage, repair is more advanced in cases in which Plastigut is used than in those in which catgut is used. This is to be expected, since with Plastigut there is no irritating inflammatory and exudative reaction to hinder repair. There is no danger in leaving Plastigut in place; after two years it has been found intact, virtually a part of the supporting structures.

Plastigut is used in smaller sizes, due to its greater tensile strength. Plain Plastigut is offered in sizes No. 00, 0000 and 00000. Black, for skin work, is offered in sizes No. 0, 0000 and 00000. Size No. 00 is recommended for all general work, size No. 0000 for ties, size No. 00000 for plastic surgery and No. 0 for heavy tension sutures.

Plastigut Surgical Sutures, 60", in envelopes, (state size, plain or black) per dozen.....$2.40. Per gross.....$25.00

References to the literature provided on request.

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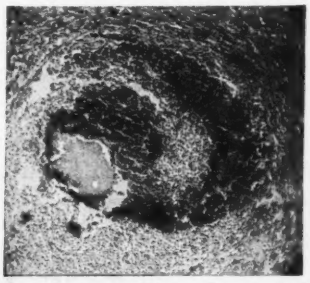
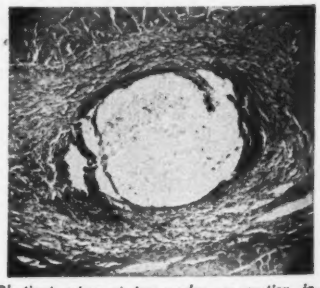
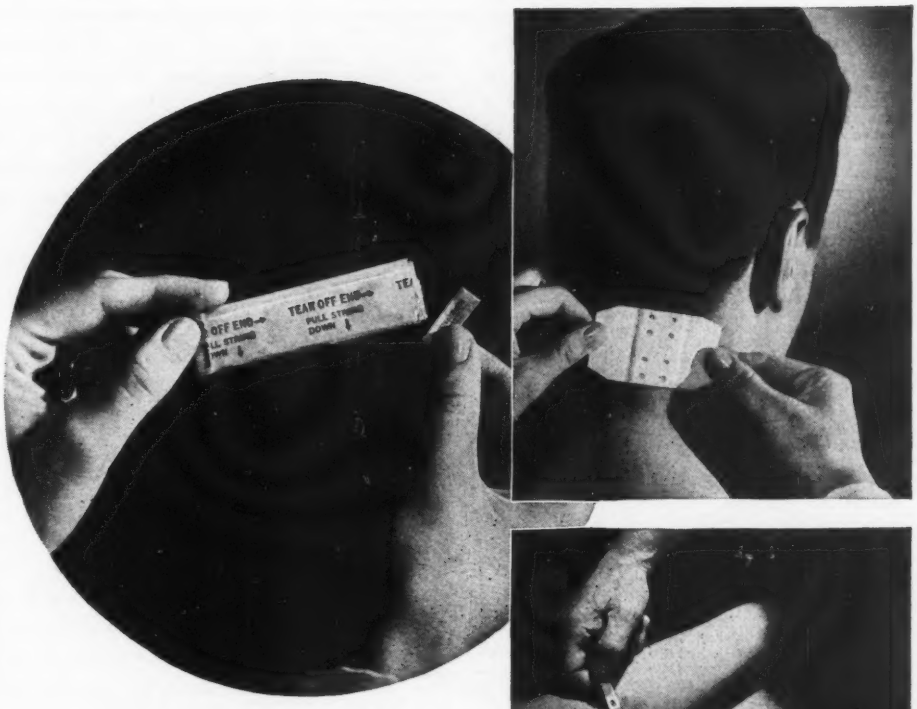


Plain catgut suture at two weeks; note absorption and inflammation.



Plastigut suture at two weeks; no reaction, inflammation or absorption.



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NEW BRUNSWICK, N. J. CHICAGO, ILL.

Continued from page 50

Dr. John Olson, St. Louis, aged 71, died recently of coronary occlusion.

Dr. Eldon Phillips, Cape Girardeau, aged 90, died recently of chronic myocarditis.

Dr. Addison G. Swaney, Lees Summit, aged 59, died June 3 of hypertension and nephritis.

Dr. Chauncey G. Wright, St. Louis, aged 68, died June 10.

Dr. George Washington Vinyard, Jackson, aged 91, died July 2.

NORTH CAROLINA

The Southern Tuberculosis Conference will be held in Asheville, September 15-17.

Several North Carolina physicians were elected to positions of honor and responsibility at the annual meeting of the National Tuberculosis Association and the American Trudeau Society in San Antonio, Texas, recently: Dr. Paul P. McCain, Sanatorium, the retiring President of the National Tuberculosis Association, was elected to the Executive Committee of the National Tuberculosis Association and to the Council of the American Trudeau Society and was made Chairman of the Rehabilitation Committee of the Council. Dr. David T. Smith, Durham, was made Chairman of the Program Committee of the American Trudeau Society. Dr. S. M. Bittinger, Black Mountain, was reelected as a Director of the National Tuberculosis Association. Dr. Paul H. Ringer, Asheville, and Dr. R. L. Carlton, Winston-Salem, are on the Board of Directors of the National Tuberculosis Association.

The first Mental Hygiene Clinic to be held in Asheville was conducted by Dr. D. J. Sullivan recently.

Dr. William deB. MacNider, Chapel Hill, has been elected President of the Society for Experimental Biology and Medicine for the coming year.

Dr. Fred C. Kluth, a Fellow of the Rockefeller Foundation, was in Chapel Hill during the summer carrying on a serological survey of syphilis in Chatham County.

Dr. William Pitts, Charlotte, has been certified by the American Board of Surgery.

Dr. Robert L. McMillan, Winston-Salem, has been certified by the American Board of Internal Medicine.

Dr. Charles Hartwell Cocke, Asheville, was unanimously reelected Chairman of the Board of Governors of the American College of Physicians at its recent meeting.

Dr. William Redin Kirk, Hendersonville, recently celebrated his fiftieth anniversary in the practice of medicine.

Dr. William C. Cheves, Bunn, has been appointed Medical Director of the State Prison System and Dr. Benjamin J. Lawrence, Raleigh, Prison Surgeon.

Dr. Len D. Hagaman, Boone, has been appointed Health Officer of Caldwell and Burke Counties to succeed Dr. Wesley G. Byerly, Lenoir, who resigned because of ill health.

Dr. Albert Earl Barnhardt, Kannapolis, and Miss Margaret Helen Martin were married recently.

Dr. Henry Boone Grant, Garysburg, and Miss Elizabeth Cheatham Applewhite, Halifax, were married recently.

Dr. Marler Slate Tuttle, Kannapolis, and Miss Mirian Thompson Goodrum, Davidson, were married June 18.

Dr. Charlie Louis Sykes, Pilot Mountain, and Miss Dorabelle Graves, Mount Airy, were married recently.

Dr. Winter C. Wallace and Miss Mildred Taylor, both of Rutherfordton, were married in June.

Dr. Thomas Gardiner Thurston, Taylorsville, and Miss Susan Rankin Fountain, Rocky Mount, were married June 10.

Dr. Joseph Samuel Holbrook, Statesville, and Miss Nancy Wheeler Cox, Raleigh, were married recently.

Dr. Otis Hunter Jones and Mrs. Nancy Hovis Nichols, both of Charlotte, were married recently.

Dr. Benjamin Hackett Harding, Yadkinville, and Miss Eula Blanche Bare, Jefferson, were married in June.

Dr. Jerome Bostick Hamer, Charlotte, and Miss Frances Rice Hill, Roanoke, were married recently.

Dr. Charles White Millender, Asheville, and Miss Dorothy Thompson Aiken, Columbia, were married June 7.

Dr. J. Dent Summers, Statesville, and Miss June Rogers, Burlington, Iowa, were married June 21.

Deaths

Dr. William Edgar Braswell, Sandy Ridge, aged 61, died June 16 of cerebral hemorrhage.

Dr. Benjamin J. McGoogan, Morven, aged 52, died recently of coronary occlusion.

OKLAHOMA

The Board of Trustees of the Oklahoma State Hospital Association has announced that in the future the Association will issue monthly a publication to be known as the Bulletin of the Oklahoma State Hospital Association.

Dr. Roy L. Smith, Tulsa, has been reelected to serve as Chairman of the Annual Secretaries' Conference of the Oklahoma State Medical Association. Other officers elected are Dr. Rush L. Wright, Poteau, Vice-President, and Dr. Shade D. Neely, Muskogee, Secretary-Treasurer.

The annual meeting of the International Association of Milk Sanitarians will be held in Tulsa, October 27-29.

Deaths

Dr. Charles D. Johnson, Tulsa, aged 60, died June 22.

Dr. Edmund Sheppard Ferguson, Oklahoma City, aged 71, died June 28.

Dr. John Frank Sargent, Oklahoma City, aged 47, died recently.

Dr. S. N. Mayberry, Enid, aged 73, died June 22 of coronary embolism.

Dr. David A. Yates, Avant, aged 62, died recently of an embolus following an operation on the gallbladder.

SOUTH CAROLINA

Dr. Frank H. McLeod, who has practiced in Florence for fifty years, has been awarded the distinguished service plaque of 1941 by the South Carolina Department of the American Legion, the presentation being made at Myrtle Beach June 16. The American Legion plaque has been given each year since 1927 to a South Carolina man or woman who has rendered distinguished unselfish service to the State.

South Carolina Public Health Association, at its recent annual meeting, installed Dr. Alva W. Humphries, Camden, President, and elected Dr. Joseph E. Brodie, Greenwood, President-Elect.

South Carolina Pediatric Society, at its recent annual meeting,

Continued on page 54

LaMOTTE BLOOD CHEMISTRY SERVICE

NEW LaMOTTE
PHENOLSULFONPHTHALEIN OUTFIT
(ROULETTE TYPE)

This new LaMotte outfit employs a new principle of comparison developed in the LaMotte Research Laboratory to give greater accuracy in the phenolsulfonphthalein test. The procedure used with this outfit has proved effective in removing the source of error attributed to the presence of turbidity and color in the urine specimen. Price, complete with daylight reading arrangement, plug-in attachment, and snap switch—$50.00 F. O. B. Towson.

Further information about this outfit will be gladly sent on request.

This Service includes a series of similar outfits for conducting the following accurate tests: Blood Sugar, Blood Urea, Icterus Index, Phenolsulphonphthalein, Urine pH, Blood pH, Gastric Acidity, Calcium-Phosphorus, Blood Bromides, Blood Proteins, Urinalysis.

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and
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Sulfonamide

SULFADIAZINE

(2-sulfanilamidopyrimidine)

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THE RELEASE OF THIS NEW SULFONAMIDE has been eagerly awaited by the medical profession the world over. Already many publications covering the pharmacological and clinical action of sulfadiazine have borne out its advantage over other sulfonamides. "Sulfadiazine" is now recognized as an exceedingly effective agent in the treatment of pneumococcal pneumonias.

Compared with other antipneumococcal sulfonamides, Sulfadiazine possesses the following advantages:

1—reduced occurrence of nausea and vomiting;

2—high blood concentrations, readily attained following oral dosage;

3—low proportion of acetylated sulfadiazine in the blood;

4—gradual decline of sulfadiazine blood levels following discontinuance of the drug;

5—ready penetration into ascitic or pleural fluids, and cerebro-spinal fluid;

6—greater solubility in aqueous solution, of acetyl sulfadiazine than that of sulfadiazine itself.

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Continued from page 52

elected Dr. Isaac H. Grimball, President; Dr. Lonita M. Boggs, Greenville, Vice-President; and Dr. Hilla Sheriff, Columbia, Secretary.

Dr. William M. Fox, Assistant Physician at South Carolina State Hospital, Columbia, reported for duty in June at the Army Medical Center, Washington, D. C.

Dr. Graham Shaw, Columbia, has entered the Coast Artillery at Fort Davis, Holly Hill, North Carolina.

Dr. R. S. Plenge, who finished her internship at the Columbia Hospital recently, is now doing public health work in Dallas, Texas.

Dr. Martin D. Young has been appointed Director of the Malaria Research Laboratory of the U. S. Public Health Service at the State Hospital in Columbia.

Dr. C. N. Wyatt, Greenville, Captain in the Medical Reserve Corps, was ordered to report at Camp Blanding, Florida, the last of June.

Dr. R. P. Jeanes, formerly of Easley, is now located at Camp Forrest, Tennessee.

Dr. J. W. Brunson, Camden, is now located at Fort Benning, Georgia.

Dr. W. T. Brockman, Greenville, was recently elected as Commander of Frank Roach American Legion Post.

Dr. C. O. Bates, Greenville, has been named President of the Association of Surgeons of the Southern Railway System for the ensuing year.

The following physicians were appointed as the Advisory Council of the Woman's Auxiliary to the South Carolina State Medical Association: Dr. Robert Wilson, Charleston; Dr. C. C. Ariail, Greenville; Dr. Frank Strait, Rock Hill; Dr. William Weston, Jr., Columbia; and Dr. Julian Price, Florence.

Dr. Dillon R. McClary, who has been practicing in Virginia, has moved his office to Lynchburg.

Dr. James C. Bradham, formerly Health Director of Coleton County, has assumed his duties as Director of the Health Departments in Laurens and Union Counties, and is located at Union.

Dr. W. Lamar Bryan and his wife, Dr. Margaret S. Bryan, will serve as temporary physicians for the University of South Carolina, Columbia, until the return of Dr. E. H. Law, University physician. Dr. Lamar Bryan is a native of Conway, and Dr. Margaret Bryan a native of New Orleans, Louisiana.

Dr. F. P. Coleman, Columbia, has been made a member of the American Society of Thoracic Surgeons.

Dr. Myron Gordon Howle, Summerton, and Miss Carolyn Giles Ariail, Greenville, were married June 12.

Dr. William Henry Breeden, Bennettsville, and Miss Mary Fowler Robinson, Sand Spring, Maryland, were married in June.

Dr. Leonidas Cary Davis, Columbia, and Miss Carrie Rebecca Thompson, Cope, were married June 4.

Dr. James Harvey Johnston, Jr., Spartanburg, and Miss Jane Chauvin Hochendel were married June 14.

Dr. Edward Lowry Shuler, State Park, and Miss Alberta Stoll Prince, Charleston, were married recently.

Dr. William Southward Scott, Spartanburg, and Miss Lucille Loggins, Dickson, Tennessee, were married June 11.

Deaths

Dr. Vincent Pangolli Bell, Greenville, aged 53, died June 12 of cirrhosis of the liver.

Dr. Herbert E. Purcell, Charleston, aged 74, died June 21 of cerebral hemorrhage, hypertension and arteriosclerosis.

Dr. J. Frank Williams, Roebuck, aged 75, died June 10 of bronchopneumonia and pulmonary emboli.

TENNESSEE

Tennessee Public Health Association, at its recent annual meeting, installed Dr. Lloyd M. Graves, Memphis, President, and elected Dr. William H. Enneis, Knoxville, President-Elect; Dr. John J. Lentz, Nashville, retiring President, automatically became Vice-President; and Dr. Robert H. Hutcheson, Nashville, Secretary, reelected.

Dr. W. Likely Simpson, Memphis, recently elected President of the American Bronchological and Esophalogical Society, and Dr. Richmond McKinney, Memphis, who was elected and served as President in 1932, were recently honored at a dinner by the Memphis Society of Bronchology and Esophagology.

Continued on page 56

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Continued from page 54

A joint health unit for Chattanooga and Hamilton Counties was placed in operation July 1 with Dr. Fray O. Pearson, County Health Director, as Director, and Dr. William C. Sanford, City Health Commissioner, as Assistant Director.

Dr. W. D. Burkhalter, Associate Director of County Health Work in the Alabama State Department of Health, Montgomery, has been appointed Health Officer of Shelby County with headquarters in Memphis, succeeding Dr. Robert D. Hollowell, who has gone to St. Petersburg, Florida, as Health Officer of Pinellas County.

Dr. Harold J. Starr, Chattanooga, was elected Vice-President of the Emory University Alumni Association at its recent annual meeting.

Dr. Steve W. Coley, of the Methodist Hospital, Memphis, announces the association of Dr. Van A. Odle, Washington, D. C., in the practice of radiology.

Dr. G. F. McGinnes, Consultant in Venereal Disease Control in the Shelby County Health Department, Memphis, has been appointed Director of Venereal Disease Control in the State Department of Health at Nashville.

Dr. Thomas L. Harvey, Newport, Health Officer of Cocke County, has been transferred to the Dyer-Crockett Counties Health District with headquarters at Dyersburg. Dr. Luke W. Frame, Ripley, has succeeded Dr. Harvey.

Dr. Arthur K. Husband, Waterbury, Connecticut, has been appointed Health Officer of Unicoi County, succeeding Dr. Landon H. Gurnee, Erwin, resigned.

Dr. Carl F. Luckey, Jackson, has been appointed Health Officer of Johnson County and is located in Mountain City.

Dr. Landon H. Gurnee, Erwin, and Miss Doris Eakin, Lexington, Mississippi, were married June 8.

Dr. Ralph G. Nichols and Miss Virginia Bruce, both of Knoxville, were married June 21.

Dr. James Gordon McMillan and Miss Willie Logan, both of Chattanooga, were married recently.

Dr. Marvin Denver McCullough, Knoxville, and Miss Margaret Elizabeth Lane, Lone Mountain, were married recently.

Dr. Edward Vernon Pollard, Parsons, and Miss Dorothy Templeton were married June 27.

Dr. Charles Clarke Smeltzer and Miss Helen Pauline Brown, both of Knoxville, were married recently.

Deaths

Dr. Albert S. Corbin, Tennessee City, aged 79, died recently.

Dr. Seth Wade Huffman, McKenzie, aged 68, died recently of cardiovascular disease.

Dr. John O. Mathews, Memphis, aged 83, died June 9 of pulmonary abscess.

Dr. Thomas Earl Goyer, Jackson, aged 53, died June 16 of hemorrhage due to gastric ulcer.

TEXAS

Texas Dermatological Society has elected Dr. Arthur G. Schoch, Dallas, President; Dr. William F. Spiller, Galveston, Vice-President; and Dr. Duncan O. Poth, San Antonio, Secretary, reelected.

Texas Neurological Society has elected Dr. James Greenwood, Jr., Houston, President; Dr. Giles W. Day, Fort Worth, and Dr. John A. McIntosh, San Antonio, Vice-Presidents; and Dr. Fred Terry Rogers, Dallas, Secretary.

Baylor Hospital Staff, Dallas, has elected Dr. C. B. Carter, President; Dr. Raymond Willis, Vice-President; and Dr. C. A. Ault, Secretary.

Dr. H. F. Connally, Waco, Dr. N. D. Buie, Marlin, Dr. M. H. Crabb, Fort Worth, and Dr. W. C. Morrow, Greenville, have been appointed to the State Board of Medical Examiners.

Dr. O. B. Kiel, Wichita Falls, has been appointed a member of a national medical board by the Office of Civilian Defense to devise uniform procedure for protecting civilians in any emergency.

Dr. Robert J. Wagner, Cuero, has been doing postgraduate work in New Orleans, Louisiana.

Dr. John H. Barrett, Palestine, is doing postgraduate work in the Manhattan Eye, Ear, Nose and Throat Hospital, New York.

Dr. Arnold Manske, Waco, won the championship cup at the recent annual golf tournament during the State Medical Association meeting in Fort Worth.

Continued on page 58

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Director

Continued from page 56

Dr. E. J. Cook, Monahans, was recently appointed Health Officer of that city.

Dr. Looney Fenlaw and Miss Irene Sanford, both of Gilmer, were married June 8.

DEATHS

Dr. William Hector Buchan, Gilmer, aged 65, died June 2.

Dr. John William Duncan, Jourdanton, aged 68, died recently.

Dr. Meyer Bodansky, Galveston, aged 44, died June 14 of bronchopneumonia following bilateral mastoiditis.

Dr. John Turner Bynum, Jr., Big Spring, aged 38, died recently of gastric hemorrhage.

Dr. Hubert Henry Fletcher, McAllen, aged 68, died recently.

Dr. Edgar C. Hutchins, Greenville, aged 62, died June 21 of cerebral hemorrhage and pneumonia.

Dr. William H. Heisen, El Paso, aged 78, died recently of coronary occlusion.

Dr. William R. Kellam, Perryville, aged 84, died recently of carcinoma of the urinary bladder.

Dr. Robert Everett Moss, LaGrange, aged 83, died recently.

Dr. Ira Chestnut Young, El Paso, aged 69, died recently of cerebral hemorrhage.

VIRGINIA

Virginia Society of Ophthalmology and Otolaryngology, at its recent annual meeting, installed Dr. Mortimer H. Williams, Roanoke, President, and elected Dr. Guy R. Fisher, Staunton, President-Elect; and Dr. Meade C. Edmunds, Petersburg, Secretary.

American Association of Obstetricians, Gynecologists and Abdominal Surgeons will hold its next annual meeting in Hot Springs, September 11-13. Dr. James R. Bloss, 418 Eleventh Street, Huntington, West Virginia, is Secretary.

Medical Section of the American Life Convention, at its thirty-first annual meeting recently held at Hot Springs, elected Dr. Wilton F. Blackford, Louisville, Kentucky, Chairman of the group; Dr. Thomas H. Dick, St. Paul, Minnesota, Vice-Chairman; and Dr. Benjamin F. Byrd, Nashville, Tennessee, Secretary.

Committee on Industrial Health of the Medical Society of Virginia and the Bureau of Industrial Hygiene of the State Department of Health will present the second Symposium on Industrial Health at the Medical College of Virginia, Richmond, September 11-12, with the cooperation of the Virginia Manufacturers' Association and the Richmond Chamber of Commerce.

Warwick County Medical Society has elected Dr. O. C. Jones, President; Dr. H. W. Potter, Vice-President; and Dr. Paul Hogg, Secretary-Treasurer, all of Newport News.

Fauquier County Medical Society has elected Dr. Henry L. Townsend, Marshall, President; Dr. V. L. McCullers, Remington, and Dr. George H. Davis, Warrenton, Vice-Presidents; and Dr. William R. Pretlow, Warrenton, Secretary-Treasurer, re-elected.

Dr. Wiley Davidson Lewis, formerly Assistant Superintendent of the Western State Hospital, Tennessee, has joined the staff of Saint Albans Sanatorium in Radford.

Dr. Allen W. Lane is located in Blackstone, where he is engaged in general practice.

Dr. Oscar Swineford, Jr., Charlottesville, was elected Vice-President of the American Society for the Study of Allergy at its recent meeting, held in Cleveland.

Dr. John H. Bonner, since 1938 Health Officer of the District in Virginia composed of Page, Warren and Shenandoah Counties, has resigned and will return to his native State of North Carolina and engage in private practice at Elizabeth City.

Dr. James H. Gressette, of the Staff of the Gill Memorial Eye, Ear, Nose and Throat Hospital, Roanoke, has returned from Philadelphia after taking a special course in bronchoscopy and laryngeal surgery at the Graduate Hospital of the University of Pennsylvania.

Dr. T. J. Humphries, formerly of Culpeper, is now associated with Dr. E. Berkeley Neal in the practice of pediatrics with offices in the Shenandoah Life Building, Roanoke.

Dr. S. A. Draper has moved from Roanoke to Orlando, Florida.

Dr. Herbert Carl Lee announces the opening of his office in the Medical College of Virginia Hospital, practice limited to surgery.

Dr. Reuben F. Simms, Richmond, was recently elected a Vice-President of the Lions Club.

Dr. W. Gayle Crutchfield, Richmond, since 1937 Associate Clinical Professor of Neurological Surgery at the University of Virginia, has recently been promoted to the Head of the Department, succeeding Dr. C. C. Coleman, and has moved to Charlottesville to assume this new position.

Continued on page 60

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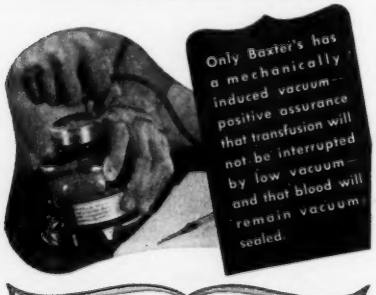
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Continued from page 58

Dr. J. M. Meredith, who was Assistant Clinical Professor under Dr. C. C. Coleman at the University of Virginia, has resigned to become Associate Professor of Neurological Surgery at the Medical College of Virginia, Richmond, and in the future will be associated with Dr. Coleman in his private work.

Dr. F. N. Mullens, Jr., has moved from South Mill, North Carolina, to Norfolk.

Dr. Lyddane Miller, formerly of Piney River, is now located for practice at Amherst Court House.

Dr. Louise Fry Galvin, Assistant Professor of Pediatrics at the Medical College of Virginia, Richmond, has been appointed to the staff of the State Department of Health as Pediatric Consultant of the Orthopedic Division of the Crippled Children's Bureau and Medical Supervisor of the Department's Children's Rheumatic Fever Program.

Dr. A. M. Showalter was recently elected an officer of Rotary International at the convention held in Denver.

Dr. H. B. Webb has been made Physician-in-Charge of the Waynesboro Community Hospital. He will act as administrator and conduct his practice of medicine and surgery with offices at the hospital.

Dr. Hugh Carter Henry, Director of State Hospitals of Virginia, Richmond, is a member of the Committee on the History of Psychiatry organized by the American Psychiatric Association to prepare a history of psychiatry in the United States. It is hoped that the history will be finished for the Centennial meeting of the Association in Philadelphia in 1944.

Dr. John Washington Clark, Front Royal, and Miss Sallie McArthur Mason, Ridgeway, were married June 24.

Dr. Stanley H. Macht, Crewe, and Miss Naomi Newman, Danville, were married July 1.

Dr. Alva Duckett Daughton, East Falls Church, and Miss Vera Alice Hanson, Richmond, were married July 18.

Dr. William L. Venning, Arlington, and Dr. Laura Ross, Charlotte, North Carolina, were married June 13.

Dr. Thomas Nathaniel Jacob, Jr., Onancock, and Miss Flora Phillips Miller, Ellerson, were married June 21.

Dr. Jean McNutt Martin, Middlebrook, and Mr. Ralph Allen Glasgow, Roanoke, were married recently.

Dr. Francis Record Whitehouse, Lynchburg, and Miss Doris Irion, Dallas, Texas, were married June 21.

Dr. John Hansford Thomas, Jr., Greenville, and Miss Mary Johnston Lasly, Staunton, were married June 19.

Deaths

Dr. Allen J. Black, Richmond, aged 76, died June 25 of a heart attack.

Dr. Richard McCord Hoffman, Orkney Springs, aged 61, died June 17 of coronary thrombosis.

Dr. Edgar A. Pole, Hot Springs, aged 71, died July 19.

WEST VIRGINIA

Sixth Councillor District of the West Virginia State Medical Association will meet jointly with the West Virginia Tuberculosis Association at Beckley, September 17.

Dr. William M. Sheppe, Wheeling, was called to active duty with the armed forces July 15. He is the ranking naval medical reserve officer in West Virginia and stationed at the Naval Hospital at the Marine Base, Quantico, Virginia. He will for the present continue his work as a member on the Publication Committee of the *West Virginia Medical Journal*.

Dr. Ralph Greenberg, formerly of Terra Alta, will be with the Farm Security Administration, Crossville, Tennessee, for the next few months, after which he expects to open an office.

Dr. Howard Ross Crews, Pineville, and Miss Elizabeth Traylor, Cherry Lawn, were married July 2.

Dr. John Harold Shanklin, Parkersburg, and Miss Nancy Elizabeth Bedford, Osawatomia, Kansas, were married July 5.

Deaths

Dr. David Rippetoe Carden, Huntington, aged 72, died July 6.

Dr. John H. Bannister, Charleston, aged 54, died June 2 of bronchopneumonia and trauma to the chest following an automobile accident.

Dr. Waitman T. Willey Dye, Grantsville, aged 80, died June 26 of rheumatic valvular heart disease and carcinoma of the stomach.

Dr. Walter S. Gilmer, Henlawson, aged 56, died June 8 of pneumonia.

Dr. Jesse A. Jamison, Fairmont, aged 81, died recently of coronary heart disease.

Dr. Raymond B. Nutter, Enterprise, aged 62, died June 20 of carcinoma of the pancreas.

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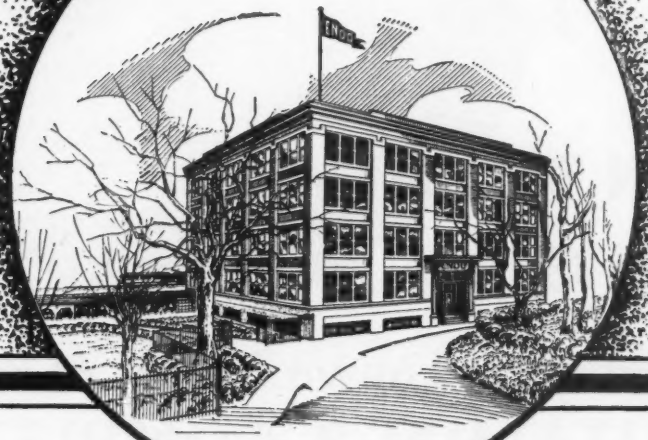

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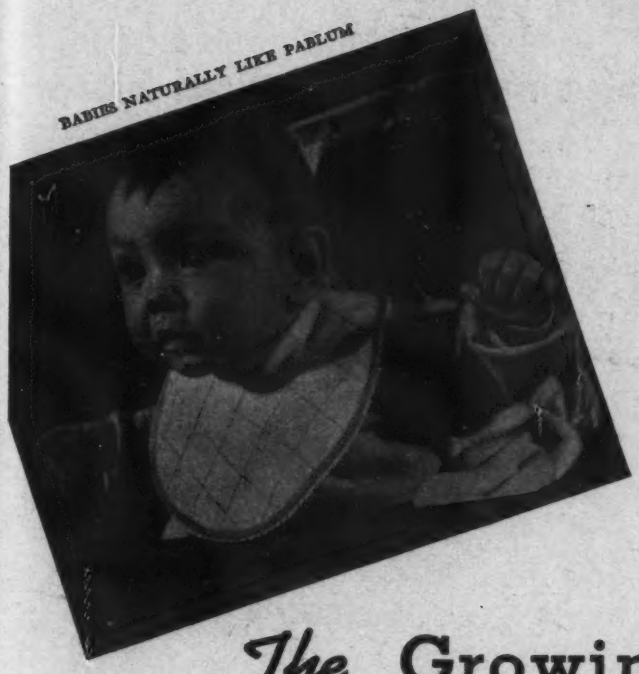

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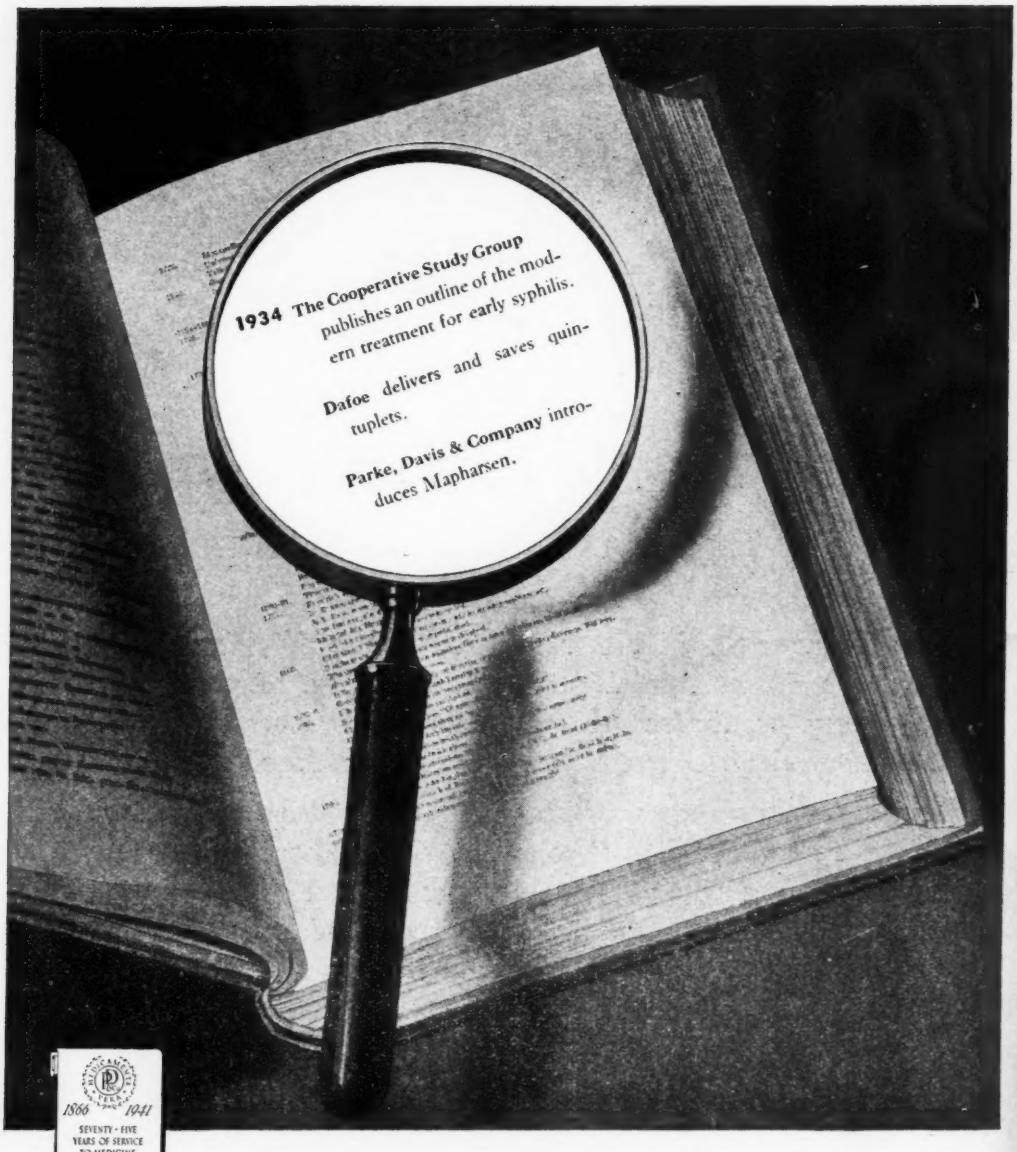
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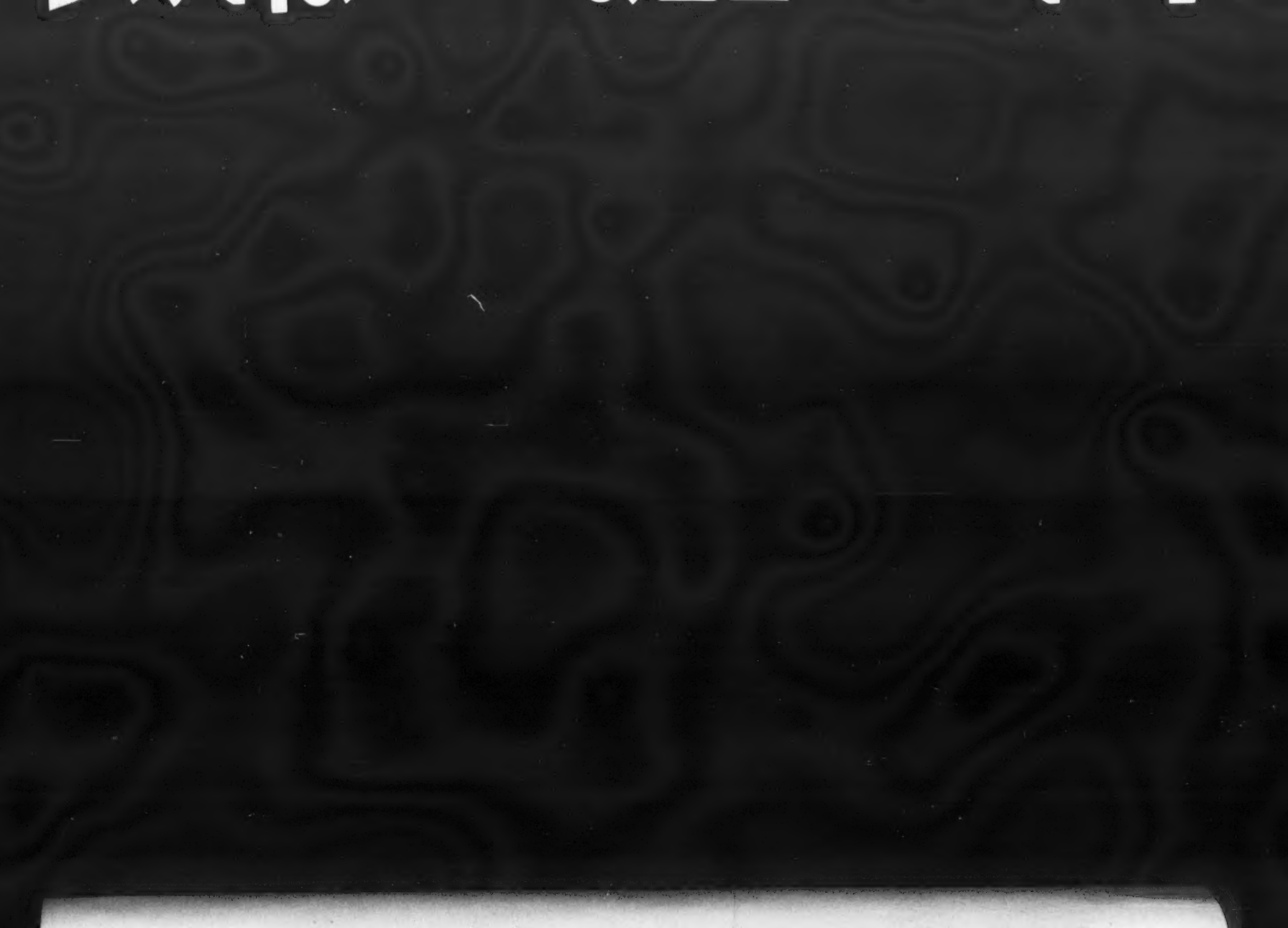
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